

**SITE INVESTIGATION  
REPORT FOR IRP SITES  
NO. 25 AND NO. 26**

**VOLUME II**

**148th FIGHTER WING  
MINNESOTA AIR NATIONAL GUARD  
DULUTH AIR NATIONAL GUARD BASE  
DULUTH, MINNESOTA**

**DISTRIBUTION STATEMENT A**

Approved for public release  
Distribution: Unlimited

**JUNE 1996**



**19960809 040**

*Prepared For*  
**HQ ANG/CEVR  
ANDREWS AFB, MARYLAND**

**SITE INVESTIGATION  
REPORT FOR IRP SITES  
NO. 25 AND NO. 26**

**VOLUME II**

**148th FIGHTER WING  
MINNESOTA AIR NATIONAL GUARD  
DULUTH AIR NATIONAL GUARD BASE  
DULUTH, MINNESOTA**

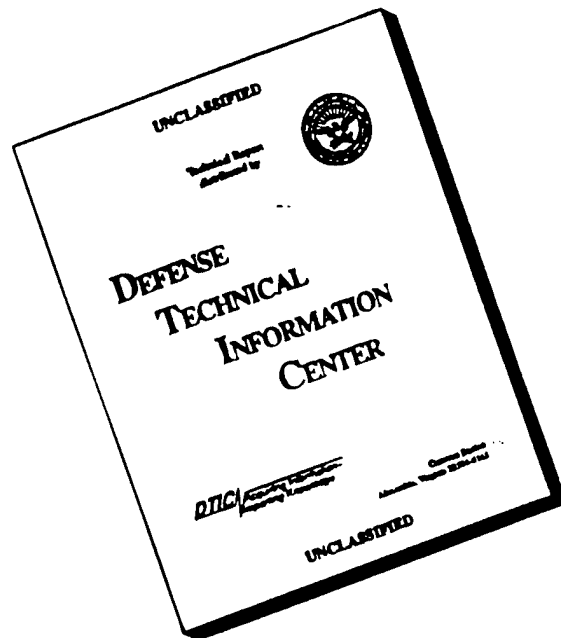
**JUNE 1996**

*Prepared For*  
**HQ ANG/CEVR  
ANDREWS AFB, MARYLAND**

*Prepared By*  
**Operational Technologies Corporation  
4100 N.W. Loop 410, Suite 230  
San Antonio, Texas 78229-4253  
(210) 731-0000**

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
<small>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.</small>				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE July, 1996		3. REPORT TYPE AND DATES COVERED Site Investigation Report
4. TITLE AND SUBTITLE Site Investigation Report for IRP Sites No. 25 and No. 26, 148th Fighter Wing, Duluth Air National Guard Base, Duluth, MN. Volume II			5. FUNDING NUMBERS	
6. AUTHOR(S)  NA				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  Operational Technologies Corp. 4100 N.W. Loop 410, Suite 230 San Antonio, TX 78229-4253			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)  ANGRC/CEVR 3500 Fetchet Avenue Andrews AFB MD 20762-5157			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT  Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)  Site Investigation Report for IRP Sites No. 25 and No. 26, 148th Fighter Wing, Duluth Air National Guard Base, Duluth, MN; Volume II, Appendix A through L. This is the second volume of a four volume site investigation report. This investigation involves two sites; site 25 -- Old Motor Pool area; and site 26 -- Ramp Disposal Area. Soil and groundwater contamination above state action levels were found at site 25; no significant contamination was found at site 26. Site 25 cleanup will be included in the scheduled cleanup of site 21.				
14. SUBJECT TERMS  Installation Restoration Program; Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); Air National Guard; Site Investigation; Minnesota Air National Guard; Duluth, MN.			15. NUMBER OF PAGES  694	
17. SECURITY CLASSIFICATION OF REPORT Unclassified			16. PRICE CODE	
18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified		19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified		20. LIMITATION OF ABSTRACT None

# DISCLAIMER NOTICE



THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.



**APPENDIX A**  
**BORING LOGS**

## INTRODUCTION

Boring log diagrams have been compiled for each borehole location drilled during this study. Diagrams are presented in numerical order within each site. The borehole identification is keyed to the site number (017-01BH), borehole (BH), or monitor well designation (MW). The diagrams combine in one page both a verbal and graphical illustration of the lithology encountered during drilling, water level data encountered during drilling, and surveyed elevation of the ground surface at the borehole location.

Drilling records are organized sequentially by number for boreholes and the monitor well. The borehole identification is keyed to the site number and borehole type such as soil boring for acoustic topography survey (BH) or monitor well designation (MW).

The soil core was scanned for volatile organic compounds prior to describing the soil core and results were recorded on the boring logs. As soon as the soil core was removed from the sampling assembly, a portable Thermo Instrument Model 580B photoionization detector was used to monitor for volatile organic compounds and a portable HMX251 explosimeter was used to monitor the lower explosive limit and percent oxygen.

The sample description includes the primary major component or components, color, consistency, relative density, texture, moisture, and observations of each distinct lithologic change encountered. Each distinct lithologic change that was encountered was defined by the Unified Soil Classification System (USCS), which is based on texture, sorting of clasts, and plasticity of soils. The color was determined by visually comparing the color of the sample with the Munsell Soil Color Charts. The texture was visually estimated and described using the following semi-quantitative adjectives:

<u>Adjective</u>	<u>Estimated Percent of Total Sample</u>
Trace	0 - 5
Little	5 - 12
Some	12 - 35
Add	35 - 50

These adjectives precede the lithology, such as little clay (5 - 12% clay) or some sand (12 - 35% sand).

The classification: Sand, granule, cobble, and boulder, was assigned using the grain-size scale given in the USCS. Gravel clast sizes, boulder, cobble, and pebbles were measured using a steel tape in the field. On the original field lithologic logs, clasts that were 4 inches or greater in size and those that were from 2 to 4 inches in size were reported as boulders and cobbles, respectively.

The fine fraction was described using one of the following terms: Silt, silt and clay, or clay. These are field terms and take into account plasticity as well as grain size. The distinction between clay and silt was based on how easily a small piece of soil could be rolled into a thin ribbon. Clay can easily be smeared into a ribbon when wet while silt is smeared with more difficulty. A dry sample of clay is difficult to crush with fingers while a dry sample of silt is more easily crushed.

## LITHOLOGIC LOGS

Lithologic symbols are derived and generalized from the USCS shown in Figure A.1.

In the boring logs that follow, the column headings have the following meaning:

Depth:	Depth in feet below surface.
Blows:	The number of blows required to drive a split-spoon sampler an additional 24 inches into the ground beyond the initial 6-inch set.
Ambient Temperature Headspace Analysis (ATHA):	The reading of photoionizable compounds detected in the contained soil sample by a photoionization detector.
Samples:	The interval of sample cored below land surface.
Percent Recovery:	The percentage of sample recovered in the split-spoon sampler per sampling run.
USCS:	Unified Soil Classification System based on texture, sorting of clasts and plasticity of soils.

# KEY TO BORING LOG SYMBOLS

## UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2487

MAJOR DIVISIONS			SYMBOL/ GRAPHIC	DESCRIPTIONS
COARSE-GRAINED SOILS (>50% Smaller Than #200 Sieve)	GRAVELS  (More than 50% of coarse fraction is larger than the #4 sieve size.)	Clean gravels with little or no fines	GW	Well-Graded Gravels, Gravel - Sand Mixtures
			GP	Poorly Graded Gravels, Gravels - Sand Mixtures
		Gravels with over 12% fines	GM	Silty Gravels, Poorly Graded Gravel-Sand-Clay Mixtures
			GC	Clayey Gravels, Poorly Graded Gravel-Sand-Clay Mixtures
	SANDS  (More than 50% of coarse fraction is smaller than the #4 sieve size.)	Clean sands with little or no fines	SW	Well-Graded Sands, Gravelly Sands
			SP	Poorly Graded Sands, Gravelly Sands
		Sands with over 12% fines	SM	Silty Sands, Poorly Graded Sand-Silt Mixtures
			SC	Clayey Sands, Poorly Graded Sand-Clay Mixtures
FINE-GRAINED SOILS (>50% Smaller Than #200 Sieve)	SILTS AND CLAYS  (Liquid limit less than 50)	ML	Inorganic Silts and Very Fine Sands, Silty or Clayey Fine Sands	
		CL	Inorganic Clays of Low to Medium Plasticity: Gravelly, Sandy or Silty Clays; Lean Clays	
		OL	Organic Clays and Organic Silty Clays of Low Plasticity	
	SILTS AND CLAYS  (Liquid limit greater than 50)	MH	Inorganic Silts, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silts	
		CH	Inorganic Clays of High Plasticity Fat Clays	
		OH	Organic Clays of Medium to High Plasticity, Organic Silts	
	HIGHLY ORGANIC SOILS			Pt



Sample retained for on-site screening.



Sample prepared for laboratory analysis.



Water Table Level.

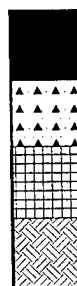
PID Photo-Ionization Detector readings (ppm).

ND Parameter Not Detected

NA Measurement Not Applicable, Groundwater Not Detected

- No Measurement Performed

NR No Sample Recovery



Asphaltic Concrete



Portland Cement Concrete



Cement Grout



Boulders or Bedrock

DRAFT  
FIGURE A.1

FORMS\KEYLOG2

KEY TO BORING LOG SYMBOLS  
Duluth Air National Guard Base  
Duluth, Minnesota

OPTTECH  
OPERATIONAL TECHNOLOGIES  
CORPORATION

AUGUST 1995

PID:

A Photoionization Detector used to monitor volatile organic compounds in uncontained soil and/or groundwater samples.

## REFERENCES

Casagrande, A., 1948. Classification and identification of soils. Transactions of the American Society of Civil Engineers 113:901.

Folk, R. L., 1980. Petrology of Sedimentary Rocks. Hemphill Publishing Company. Austin, TX. p. 182.



**DULUTH SI**  
**DULUTH, MINNESOTA, SITE 25**

**O P T E C H**  
**OPERATIONAL TECHNOLOGIES**  
**CORPORATION**

**LOG OF BORING 025-02BH**

<b>Project No.:</b> 1315-197	<b>Sampling Method:</b> Split Spoon Sampler
<b>Logged By:</b> Kathleen Merino	<b>Depth Drilled:</b> 15 ft.
<b>Drilling Co.:</b> American Engineering Testing	<b>Depth To Water:</b> 11 ft
<b>Driller:</b> J. Tuura	<b>Date Measured:</b> 05/15/95
<b>Date Drilled:</b> 05/15/95	<b>Surface Elevation:</b> 1421.24 ft.
<b>Drilling Method:</b> Hollow-Stem Auger	

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
4	4	40			Asphalt	0	58		
17	17				Silt, little sand (fine), trace gravel (pebble-cobble) dry.				
9	9				Dark Brown (7.5 YR 4/4).				
7	7					541	1391		
					Same as above.				
5	11	60				330	1339		
	10								
	16								
	15								
10	10	60			Strong hydrocarbon odor, silt, some sand (coarse)				
	6				Moist to wet (10 YR 2/2) Very dark brown.				
	12								
	47								
15					Boring terminated at 15 ft. BLS				
					Note: Drilling terminated at 15 feet BLS due to high				
					LEL (12.0) & PID (421 ppm) reading.				
20									

DULUTH SI

DULUTH, MINNESOTA, SITE 25

O P T E C H

OPERATIONAL TECHNOLOGIES  
CORPORATION

## LOG OF BORING 025-03BH

Project No.: 1315-197  
 Logged By: Kathleen Merino  
 Drilling Co.: American Engineering Testing  
 Driller: J. Tuura  
 Date Drilled: 05/15/95  
 Drilling Method: Hollow-Stem Auger

Sampling Method: Split Spoon Sampler  
 Depth Drilled: 25 ft.  
 Depth To Water: 23 ft. BLS  
 Date Measured: 05/15/95  
 Surface Elevation: 1420.48 ft.

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
					Asphalt				
4	4	60			Silt, little sand (fine, trace clay. Dry. Soft. Dark brown. (7.5 YR 4/4)	0	0		
5	5								
7	7								
5	5								
8	8	75			Silt, trace sand (fine), trace gravel. Firm. Slightly moist. Dark brown (7.5 YR 3/4).	0	467		
8	8								
11	11								
11	11								
10	8	75			Strong hydrocarbon odor. Silt, trace sand (fine to coarse), trace gravel. Slightly moist. Dark brown (7.5 YR 4/4).	273	727		
16	16								
14	14								
9	9								
15	9	80			Silt, trace sand (fine), slightly moist. Dark brown (7.5 YR 4/4).	133	53		
11	11								
13	13								
16	16								
20	10	80			Same as above.	9.5	10.6		
8	8								



# DULUTH, MINNESOTA, SITE 25

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>25 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>23 ft. BLS</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>05/15/95</b>
<b>Date Drilled:</b>	<b>05/15/95</b>	<b>Surface Elevation:</b>	<b>1420.48 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

[illegible]

DULUTH SI

DULUTH, MINNESOTA, SITE 25

O P T E C H

OPERATIONAL TECHNOLOGIES  
CORPORATION

## LOG OF BORING 025-04BH

Project No.:	1315-197	Sampling Method:	Split Spoon Sampler
Logged By:	Kathleen Merino	Depth Drilled:	20 ft.
Drilling Co.:	American Engineering Testing	Depth To Water:	NA
Driller:	J. Tuura	Date Measured:	NA
Date Drilled:	05/16/95	Surface Elevation:	1423.53 ft.
Drilling Method:	Hollow-Stem Auger		

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
8	8	10			Asphalt	0	0		
8	12				Fill material, silt, trace sand, trace gravel. Dry.				
12									
5	11	75			Silt, platy structure, fragile trace gravel (cobble). Dry.	0	0		
16	13				Dark brown (7.5 YR 3/4).				
13									
10	10	75			Silt and sand, dry, fragile. Dark brown (7.5 YR 3/4).	0	0		
6	6								
9	9								
16	16								
15									
6	6	30			Silt, trace sand (fine). fragile. dry. Dark brown (7.5 YR 3/4).	0	0		
3	3								
4	4								
20					Boring terminated at 20 ft. BLS				

**DULUTH SI**  
**DULUTH, MINNESOTA, SITE 25**

**O P T E C H**  
**OPERATIONAL TECHNOLOGIES**  
**C O R P O R A T I O N**

**LOG OF BORING 025-05BH**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>22 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>14 ft. BLS</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>05/16/95</b>
<b>Date Drilled:</b>	<b>05/16/95</b>	<b>Surface Elevation:</b>	<b>1423.87 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
5	5	40	X		Silt, trace clay, dry. Dark brown (7.5 YR 4/4).	1.8*	0		
8	8								
6	6								
8	8								
5	15	0	X		No recovery.	0	0		
	16		X						
	10								
	10								
10	10	80	X		Silt, some sand (medium). Soft dark brown (7.5 YR 4/4).	0	0		
	13								
	16								
	10								
15									
	12	0	X		No recovery.				
	10		X						
	8								
	8								
20	4	75	X		Silt, trace sand (medium), trace gravel (up to cobble) dark brown (7.5 YR 3/4). Very moist to wet.	0	0		
	7								

## DULUTH, MINNESOTA, SITE 25

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

Project No.:	1315-197
Logged By:	Kathleen Merino
Drilling Co.:	American Engineering Testing
Driller:	J. Tuura
Date Drilled:	05/16/95
Drilling Method:	Hollow-Stem Auger

<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Depth Drilled:</b>	<b>22 ft.</b>
<b>Depth To Water:</b>	<b>14 ft. BLS</b>
<b>Date Measured:</b>	<b>05/16/95</b>
<b>Surface Elevation:</b>	<b>1423.87 ft.</b>

Drilling Method: Hollow Stem Auger						FIELD SCREENING			
Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	PID	ATHA	-	-
	7 7		X		Boring terminated at 22 ft. BLS Note: * was background PID value, that was compensated for on future samples.				

DULUTH SI

DULUTH, MINNESOTA, SITE 25

O P T E C H

OPERATIONAL TECHNOLOGIES  
CORPORATION

## LOG OF BORING 025-06BH

Project No.:	1315-197	Sampling Method:	Split Spoon Sampler
Logged By:	Kathleen Merino	Depth Drilled:	22 ft.
Drilling Co.:	American Engineering Testing	Depth To Water:	NA
Driller:	J. Tuura	Date Measured:	05/12/95
Date Drilled:	05/12/95	Surface Elevation:	1421.05 ft.
Drilling Method:	Hollow-Stem Auger		

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
					Asphalt				
	5	80	X		Silt, little sand, fine to coarse grained sand, dry, fragile, dark brown (7.5 YR 4/4).	0	0		
	6								
	7								
	7								
5									
	10	80	X		Same as above: slightly moist.	0	0		
	10								
	11								
	12								
10									
	5	80	X		Silt trace sand, trace gravel: fine to coarse grained sand; granite cobble clasts, slightly moist; dark brown (7.5 YR 4/4).				
	9								
	13								
	17								
15									
	22	0	X		No recovery.				
	38								
	28								
	21								
20									
	9		X		Same as above, moist.	0.7	0		
	14								

# O P T E C H

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>22 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>NA</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>05/15/95</b>
<b>Date Drilled:</b>	<b>05/12/95</b>	<b>Surface Elevation:</b>	<b>1421.05 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

[illegible]

# DULUTH, MINNESOTA, SITE 25

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

Project No.:		1315-197		Sampling Method:		Split Spoon Sampler	
Logged By:		Kathleen Merino		Depth Drilled:		22 ft.	
Drilling Co.:		American Engineering Testing		Depth To Water:		14 ft. BLS	
Driller:		J. Tuura		Date Measured:		05/16/95	
Date Drilled:		05/16/95		Surface Elevation:		1425.96 ft.	
Drilling Method:		Hollow-Stem Auger					

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
1		35			Silt, trace sand (fine), trace gravel (up to cobble) slightly moist. Soft (7.5 YR 4/4).	0	0		
2									
3									
5									
7		50			Silt, little sand (fine) slightly moist. Firm. Dark brown (7.5 YR 4/4).	0	0		
15									
15									
9									
10		75			Same as above.	0	0		
10									
13									
17									
15		20			Same as above.	0	0		
5									
3									
4									
20		10			Silt, trace clay, trace gravel (up to cobble) trace sand (fine) Wet. Brown (7.5 YR 5/4).	0	0		
5									

# DULUTH, MINNESOTA, SITE 25

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

## LOG OF BORING 025-07BH

<b>Project No.:</b>	<b>1315-197</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>
<b>Driller:</b>	<b>J. Tuura</b>
<b>Date Drilled:</b>	<b>05/16/95</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>

<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Depth Drilled:</b>	<b>22 ft.</b>
<b>Depth To Water:</b>	<b>14 ft. BLS</b>
<b>Date Measured:</b>	<b>05/16/95</b>
<b>Surface Elevation:</b>	<b>1425.96 ft.</b>

[illegible]



## DULUTH, MINNESOTA, SITE 25

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>15 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>NA</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>NA</b>
<b>Date Drilled:</b>	<b>05/12/95</b>	<b>Surface Elevation:</b>	<b>1421.97 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
2 2 4 4		25	X	[Vertical Lines]	Silt, little sand (fine to coarse), trace gravel (up to cobble). Dry dark brown (7.5 YR 4/4).	0	0		
5 4 5 5 4		0	X		No recovery				
7 16 9 11		10	X	[Vertical Lines]	Silt, little sand (fine to coarse) trace gravel (up to cobble). Moist dark brown (7.5 YR 4/4).	2	12.4		
5 9 10 13 11		80	X	[Vertical Lines]	Silt, trace sand (fine), trace gravel (up to cobble) dark brown (7.5 YR 4/4).	.5	0		
4 3 5 9 15		60	X	[Vertical Lines]	Same as above.	0	0		
					Boring Terminated at 15 ft.				

**DULUTH, MINNESOTA, SITE 25**

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>
<b>Driller:</b>	<b>J. Tuura</b>
<b>Date Drilled:</b>	<b>05/12/95</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>

<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Depth Drilled:</b>	<b>15 ft.</b>
<b>Depth To Water:</b>	<b>NA</b>
<b>Date Measured:</b>	<b>05/12/95</b>
<b>Surface Elevation:</b>	<b>1417.29 ft.</b>

[illegible]

## DULUTH, MINNESOTA, SITE 25

**OPERATIONAL TECHNOLOGIES  
CORPORATION**





<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>7 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>6.5 ft. BLS</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>05/12/95</b>
<b>Date Drilled:</b>	<b>05/12/95</b>	<b>Surface Elevation:</b>	<b>1398.19 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

[illegible]

**DULUTH, MINNESOTA, SITE 25**

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

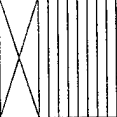
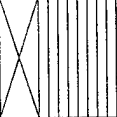


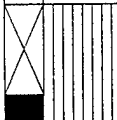
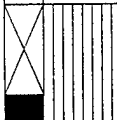


<b>Project No.:</b>	1315-197	<b>Sampling Method:</b>	Split Spoon Sampler
<b>Logged By:</b>	Kathleen Merino	<b>Depth Drilled:</b>	7 ft.
<b>Drilling Co.:</b>	American Engineering Testing	<b>Depth To Water:</b>	6.5 ft. BLS
<b>Driller:</b>	J. Tuura	<b>Date Measured:</b>	05/12/95
<b>Date Drilled:</b>	05/12/95	<b>Surface Elevation:</b>	1397.29 ft.
<b>Drilling Method:</b>	Hollow-Stem Auger		

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
1 3 4 5		30			Silt, trace (fine), moist Dark brown (7.5 YR 4/4).	0	0		
5 7 9 9 9		75			Same as above; wet.	0	-		
Boring Terminated at 7 ft.									

## DULUTH, MINNESOTA, SITE 25

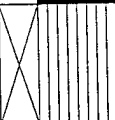
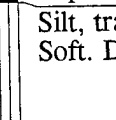
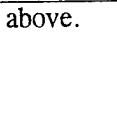

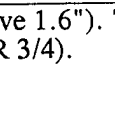
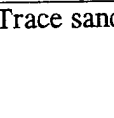


**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>20 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>NA</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>NA</b>
<b>Date Drilled:</b>	<b>05/17/95</b>	<b>Surface Elevation:</b>	<b>1421.29 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

Drilling Method: Hollow Stem Auger						FIELD SCREENING			
Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	PID	ATHA	-	-
					Asphalt				
	7	90			Silt, trace sand (medium), trace gravel (pebble). Fragile. Dry. Dark brown (7.5 YR 3/4).	0	2.8		
	7								
	6								
	6								
5	4	50			Silt, trace sand (fine). Firm. Slightly moist. Dark brown (7.5 YR 3/4).	9.6	6.9		
	8								
	9								
	18								
10	8	75			Same as above.	7.5	6.5		
	13								
	17								
	13								
15									
	3	60			Silt, trace sand (fine), trace gravel (up to cobble). Firm. Slightly moist. Dark brown (7.5 YR 3/4).	4.5	3.2		
	5								
	4								
	5								
20					Boring Terminated at 20 ft.				

**O P T E C H**  
**OPERATIONAL TECHNOLOGIES**  
**CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>20 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>NA</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>NA</b>
<b>Date Drilled:</b>	<b>05/17/95</b>	<b>Surface Elevation:</b>	<b>1421.97 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

Drilling Method: Hollow-Stem Auger					FIELD SCREENING				
Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	PID	ATHA	-	-
					Asphalt				
	6	80			Silt, trace sand (fine), trace gravel (pebble) Fragile.	0	0		
	4	Soft. Dry. Dark Brown (7.5 YR 4/4).							
	4								
	9								
5	12	20			Same as above.	0	0		
	10								
	18								
	24								
10	5	75			Silt, little gravel (up to brass sleeve 1.6"). Trace sand.	0	0		
	10				Firm. Moist Dark brown (7.5 YR 3/4).				
	19								
	14								
15									
	6	75			Silt, little to some sand (medium) well sorted, moist.	0	10.6		
	13				Soft. Dark brown (7.5 YR 3/4).				
	16								
	18								
20					Boring Terminated at 20 ft.				

DULUTH SI

DULUTH, MINNESOTA, SITE 26

O P T E C H

OPERATIONAL TECHNOLOGIES  
CORPORATION

## LOG OF BORING 026-01BH

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>10 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>6.8 ft.</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>05/04/95</b>
<b>Date Drilled:</b>	<b>05/03/95</b>	<b>Surface Elevation:</b>	<b>1422.28 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
4	30				Silt, little gravel (cobble) trace clay, trace sand (fine to medium) moist Dark brown (7.5 YR 3/3).	0	0		
10	75					-	-		
7									
10									
3									
5									
7									
7									
5	25	25			Gravel (cobble) and clay. Dark brown (7.5 YR 5/3).	0	0		
20	75					-	-		
25									
23									
8									
8		75							
11					Silt & sand (med-coarse), trace clay. Dark brown, very moist (7.5 YR 3/3).	0	0		
13									
8									
8									
10	13				Boring Terminated at 10 ft. Note: Intervals .5-2.5 and 5-7 were redrilled approx 1 foot from original location.				
14									
15									
20									

DULUTH, MINNESOTA, SITE 26

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>7 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>7 ft.</b>
<b>Driller:</b>	<b>J. Turra</b>	<b>Date Measured:</b>	<b>05/04/95</b>
<b>Date Drilled:</b>	<b>05/03/95</b>	<b>Surface Elevation:</b>	<b>1421.61 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

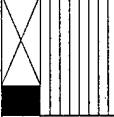
[illegible]



# DULUTH, MINNESOTA, SITE 26

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>7 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>7 ft.</b>
<b>Driller:</b>	<b>J. Turra</b>	<b>Date Measured:</b>	<b>05/04/95</b>
<b>Date Drilled:</b>	<b>05/03/95</b>	<b>Surface Elevation:</b>	<b>1422.21 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING													
						PID	ATHA	-	-										
6	9	13	13	3	7	16	15	5	8	19	22	21	75		Silt, some sand (fine to coarse), some gravel, trace clay. Dry. Dark brown (7.5 Yr 3/3).	0	0		
Boring Terminated at 7 ft.																			

DULUTH SI

DULUTH, MINNESOTA, SITE 26




O P T E C H

OPERATIONAL TECHNOLOGIES  
CORPORATION

## LOG OF BORING 026-04BH

Project No.: 1315-197  
 Logged By: Kathleen Merino  
 Drilling Co.: American Engineering Testing  
 Driller: J. Turra  
 Date Drilled: 05/03/95  
 Drilling Method: Hollow-Stem Auger







Sampling Method: Split Spoon Sampler  
 Depth Drilled: 10 ft.  
 Depth To Water: 10 ft.  
 Date Measured: 05/03/95  
 Surface Elevation: 1423.90 ft.

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
5 6 9 12		70	X		Silt, trace sand (fine) trace gravel (cobble). Dry, Dark brown (7.5 YR 3/4).	0	0		
5 8 10 11 16		10	X		Sand (medium), some silt, little gravel (cobble) dry. Dark brown (7.5 YR 3/4).	0	0		
6 6 8 9 10		50	X		Same as above (slightly moist-wet).	0	0.2		
15 20					Boring Terminated at 10 ft.				

# DULUTH, MINNESOTA, SITE 26

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>10 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>NA</b>
<b>Driller:</b>	<b>J. Turra</b>	<b>Date Measured:</b>	<b>05/03/95</b>
<b>Date Drilled:</b>	<b>05/03/95</b>	<b>Surface Elevation:</b>	<b>1424.77 ft.</b>
<b>Drilling Method:</b>	<b>Hollow-Stem Auger</b>		

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
4	7	75			Silt and sand (fine), some gravel (cobble) dry. Dark brown (7.5 YR 3/4).	0	0		
5	3	75			Sand (fine to medium), some silt, trace gravel (cobble) Dry. Dark brown (7.5 YR 3/4).	0	0		
10	10	15			Sand (medium) and silt, some gravel (cobble). Slightly moist, dark brown (7.5 YR 3/3).	0	0.3		
Boring Terminated at 10 ft.									

DULUTH SI

DULUTH, MINNESOTA, SITE 26

O P T E C H

OPERATIONAL TECHNOLOGIES  
CORPORATION

## LOG OF BORING 026-06BH

Project No.:	1315-197	Sampling Method:	Split Spoon Sampler
Logged By:	Kathleen Merino	Depth Drilled:	12 ft.
Drilling Co.:	American Engineering Testing	Depth To Water:	NA
Driller:	J. Turra	Date Measured:	05/03/95
Date Drilled:	05/03/95	Surface Elevation:	1425.43 ft.
Drilling Method:	Hollow-Stem Auger		

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING			
						PID	ATHA	-	-
7 9 9 7		70			Silt and sand (fine), some gravel (cobble), loose, dark brown (7.5 YR 3/4).	0	0		
5 11 13 10 10		75			Silt, little gravel (cobble) trace clay, trace sand (fine) slightly moist, dark brown (7.5 YR 4/4).	0	0		
17 14 17 21		0			No recovery	0	0		
10 9 15 20 21		90			Silt and clay, traces and (fine to coarse), trace to little gravel, moist, dark brown (7.5 YR 3/4).	0	0		
15					Boring Terminated at 12 ft.				

DULUTH SI

DULUTH, MINNESOTA, SITE 25

O P T E C H

OPERATIONAL TECHNOLOGIES  
CORPORATION

## LOG OF BORING 025-01MW

Project No.:	1315-197	Sampling Method:	Split-Spoon Sampler
Logged By:	Kathleen Merino	Depth Drilled:	39.8 ft.
Drilling Co.:	American Engineering Testing	Depth To Water:	32.4 ft.
Driller:	J. Tuura	Date Measured:	05/10/95
Date Drilled:	05/10/95	Surface Elevation:	1422.59 ft.
Drilling Method:	Hollow Stem Auger	TOC Elevation:	1422.56 ft.

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING				Monitoring Well
						PID (ppm)	ATHA (ppm)	BTEX (ppb)	Benzene (ppb)	
	3	50			Asphalt	0	0			
	4				Silt, trace sand (fine), trace clay, trace gravel					
	4				(up to pebble) moist Dark brown (7.5 YR					
	5				4/4).					
5	2	50			Silt, trace sand (fine to medium) trace gravel	0	0			
	5				(up to pebble) dry Dark brown.					
	16									
	16									
10	6	60			Silt, trace sand (fine), trace gravel, (up to	0	0			
	3				pebble), trace clay Soft, brittle Brown (7.5					
	4				YR 5/3). Slightly Moist					
	7									
15	11	100			Silt, trace sand (fine), trace clay, trace gravel	0	0			
	16				(up to cobble) Dry. Dark brown (7.5 YR					
	18				4/4).					
	18									
20	7	60			Silt, trace clay, trace sand (fine). Dark	0	0			
	13				brown (7.5 YR 4/4).					

DULUTH SI

DULUTH, MINNESOTA, SITE 25

O P T E C H

OPERATIONAL TECHNOLOGIES  
CORPORATION

## LOG OF BORING 025-01MW

Project No.:	1315-197	Sampling Method:	Split-Spoon Sampler
Logged By:	Kathleen Merino	Depth Drilled:	39.8 ft.
Drilling Co.:	American Engineering Testing	Depth To Water:	32.4 ft.
Driller:	J. Tuura	Date Measured:	05/10/95
Date Drilled:	05/10/95	Surface Elevation:	1422.59 ft.
Drilling Method:	Hollow Stem Auger	TOC Elevation:	1422.56 ft.

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING				Monitoring Well
						PID (ppm)	ATHA (ppm)	BTEX (ppb)	Benzene (ppb)	
37	50		X		Sand (medium to coarse) and silt, trace gravel. Dark brown (7.5 YR 4/4).					
25	14	75	X		Sand (fine to coarse) and granular, little gravel (up to cobble). Dark brown (7.5 YR 4/4) wet.	0	0			
20	20		X		Silt, trace sand (fine), trace gravel-firm. Dry. Dark brown (7.5 YR 4/4).					
24	7									
30	11	50	X		Silt, trace sand (fine). trace gravel (up to cobble) firm. Slightly moist. Dark brown (7.5 YR 4/4).	0	0			
13										
19										
35										
35	8	60	X		Same as above (moist to saturated).	0	0			
11										
17										
18										
40					Boring Terminated at 39.8 ft.					

## DULUTH, MINNESOTA, SITE 25

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

## LOG OF BORING 025-02MW

Sampling Method:	Split-Spoon Sampler
Depth Drilled:	17.0 ft.
Depth To Water:	6.0 ft.
Date Measured:	05/11/95
Surface Elevation:	1397.83 ft.
TOC Elevation:	1400.21 ft.

[illegible]

DULUTH SI

DULUTH, MINNESOTA, SITE 25

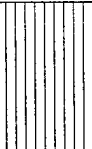
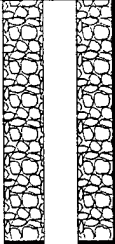
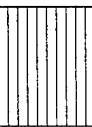

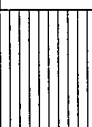
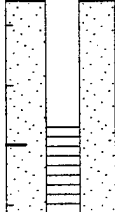

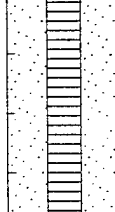

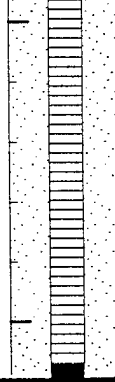
O P T E C H

OPERATIONAL TECHNOLOGIES  
CORPORATION

## LOG OF BORING 025-03MW

Project No.: 1315-197  
 Logged By: Kathleen Merino  
 Drilling Co.: American Engineering Testing  
 Driller: J. Tuura  
 Date Drilled: 05/11/95  
 Drilling Method: Hollow Stem Auger

Sampling Method: Split-Spoon Sampler  
 Depth Drilled: 22.0 ft.  
 Depth To Water: 12.7 ft.  
 Date Measured: 05/11/95  
 Surface Elevation: 1402.71 ft.  
 TOC Elevation: 1405.32 ft.

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING				Monitoring Well
						PID (ppm)	ATHA (ppm)	BTEX (ppb)	Benzene (ppb)	
3 4 7 9		60	X		Silt, little sand (fine to coarse) trace gravel (up to cobble). Soft Moist. Dark brown (7.5 YR 4/4).	0	0			
11 11 24 14		60	X		Silt, trace sand (fine), trace gravel (up to pebble). dry. Soft. Dark brown (7.5 YR 4/4).	0	0			
11 11 7 7		25	X		Silt, little sand (fine to coarse), trace gravel (up to cobble). Brown (7.5 YR 3/4).	.8	25.8			
5 1 2 2		75	X		Clay, wood fragments & peat. Moist. Black (10 YR 2/1).	15.6	5			
1 1		50	X		Silt, sand lenses (1-2" thick). Trace clay, trace gravel (up to cobble), high organics and	0	0.8			



# DULUTH, MINNESOTA, SITE 25

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

## LOG OF BORING 025-03MW

<b>Sampling Method:</b>	<b>Split-Spoon Sampler</b>
<b>Depth Drilled:</b>	<b>22.0 ft.</b>
<b>Depth To Water:</b>	<b>12.7 ft.</b>
<b>Date Measured:</b>	<b>05/11/95</b>
<b>Surface Elevation:</b>	<b>1402.71 ft.</b>
<b>TOC Elevation:</b>	<b>1405.32 ft.</b>

[illegible]

# DULUTH, MINNESOTA, SITE 26

**O P T E C H**

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

## LOG OF BORING 026-01MW

<b>Project No.:</b>	<b>1315-197</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>
<b>Driller:</b>	<b>J. Tuura</b>
<b>Date Drilled:</b>	<b>05/05/95</b>
<b>Drilling Method:</b>	<b>Hollow Stem Auger</b>


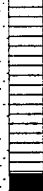

<b>Sampling Method:</b>	<b>Split-Spoon Sampler</b>
<b>Depth Drilled:</b>	<b>26.0 ft.</b>
<b>Depth To Water:</b>	<b>17.2 ft.</b>
<b>Date Measured:</b>	<b>05/05/95</b>
<b>Surface Elevation:</b>	<b>1424.69 ft.</b>
<b>TOC Elevation:</b>	<b>1424.62 ft.</b>

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING				Monitoring Well
						PID (ppm)	ATHA (ppm)	BTEX (ppb)	Benzene (ppb)	
					Asphalt					
5	5 5 5 5	60	X	[Pattern: Dotted]	Silt, some gravel (fine to medium), trace gravel (up to cobble), moist dark red-brown (7.5 YR 4/4).	0	0			[Pattern: Dotted]
5	15 20 15 14	80	X	[Pattern: Vertical Lines]	Silt, some gravel (up to cobble), trace sand (fine), dry. Dark brown (7.5 YR 4/4).	0	0			[Pattern: Vertical Lines]
10	4 2 3 4	30	X	[Pattern: Vertical Lines]	Silt, trace clay, trace gravel (up to cobble), trace sand (fine-coarse) Moist. Dark brown (7.5 YR 4/4).	0	0			[Pattern: Vertical Lines]
	8 11 13 40	80	X	[Pattern: Vertical Lines]	Silt, trace little clay, trace sand (fine to coarse) trace gravel (up to cobble) very moist dark brown (7.15 YR 4/4).	0	0			[Pattern: Vertical Lines]
15	6 10 11 13	80	X	[Pattern: Vertical Lines]	Same as above.	0	0			[Pattern: Vertical Lines]
20	11 9	60	X	[Pattern: Dotted]	Silt and sand (fine to medium) Dark brown.	0	0			[Pattern: Dotted]

DULUTH, MINNESOTA, SITE 26

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split-Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>26.0 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>17.2 ft.</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>05/05/95</b>
<b>Date Drilled:</b>	<b>05/05/95</b>	<b>Surface Elevation:</b>	<b>1424.69 ft.</b>
<b>Drilling Method:</b>	<b>Hollow Stem Auger</b>	<b>TOC Elevation:</b>	<b>1424.62 ft.</b>

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING				Monitoring Well
						PID (ppm)	ATHA (ppm)	BTEX (ppb)	Benzene (ppb)	
8 11			X		Sand and granular, some gravel (pebble-cobble) poorly sorted. Dark brown.					
8 9 13 19		70	X		Silt, little-trace sand (fine to coarse) trace clay, Grain size decreasing downward, wet. Dark brown (7.5 YR 4/4).	-	-			
					Boring terminated at 26 ft. Note: Boulder encountered at 18.5 ft BLS.					

DULUTH, MINNESOTA, SITE 26

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>
<b>Driller:</b>	<b>J. Tuura</b>
<b>Date Drilled:</b>	<b>05/06/95</b>
<b>Drilling Method:</b>	<b>Hollow Stem Auger</b>

<b>Sampling Method:</b>	<b>Split-Spoon Sampler</b>
<b>Depth Drilled:</b>	<b>22.0 ft.</b>
<b>Depth To Water:</b>	<b>11.3 ft.</b>
<b>Date Measured:</b>	<b>05/08/95</b>
<b>Surface Elevation:</b>	<b>1421.90 ft.</b>
<b>TOC Elevation:</b>	<b>1424.28 ft.</b>

[illegible]

# DULUTH, MINNESOTA, SITE 26

**OPERATIONAL TECHNOLOGIES  
CORPORATION**













<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split-Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>22.0 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>11.3 ft.</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>05/08/95</b>
<b>Date Drilled:</b>	<b>05/06/95</b>	<b>Surface Elevation:</b>	<b>1421.90 ft.</b>
<b>Drilling Method:</b>	<b>Hollow Stem Auger</b>	<b>TOC Elevation:</b>	<b>1424.28 ft.</b>

[illegible]

DULUTH, MINNESOTA, SITE 26

**OPERATIONAL TECHNOLOGIES  
CORPORATION**

<b>Project No.:</b>	<b>1315-197</b>	<b>Sampling Method:</b>	<b>Split-Spoon Sampler</b>
<b>Logged By:</b>	<b>Kathleen Merino</b>	<b>Depth Drilled:</b>	<b>17.0 ft.</b>
<b>Drilling Co.:</b>	<b>American Engineering Testing</b>	<b>Depth To Water:</b>	<b>6.3 ft.</b>
<b>Driller:</b>	<b>J. Tuura</b>	<b>Date Measured:</b>	<b>05/06/95</b>
<b>Date Drilled:</b>	<b>05/06/95</b>	<b>Surface Elevation:</b>	<b>1420.44 ft.</b>
<b>Drilling Method:</b>	<b>Hollow Stem Auger</b>	<b>TOC Elevation:</b>	<b>1422.90 ft.</b>

Depth (ft.)	Blows/6"	% Recovery	Samples	Graphic	DESCRIPTION OF MATERIALS	FIELD SCREENING				Monitoring Well		
						PID (ppm)	ATHA (ppm)	BTEX (ppb)	Benzene (ppb)			
	2	25			Asphalt							
	3				Silt, some sand (fine) trace clay, wet, dark brown (7.5 YR 4/4).	0	0					
	4											
	6											
5	48	50			Sand and gravel, trace granular, little silt, wet, fine-grained to coarse-grained sand, dark brown (7.5 YR 4/4).	0	0					
	16											
	19											
	20											
10	45	75			Same as above.	0	0					
	15											
	23											
	24											
15	1				Same as above.	0	0					
	8											
	10											
	12											
					Boring Terminated at 17 ft.							
20												

## **APPENDIX B**

### **FIELD GAS CHROMATOGRAPH ANALYSIS RESULTS**

## **INTRODUCTION**

This appendix describes the field gas chromatography (GC) analysis results of the Site Investigation (SI) for IRP Sites No. 25 and No. 26 at the Minnesota Air National Guard Base, Duluth, Minnesota. A PHOTOVAC 10S Plus portable gas chromatograph was used for field analysis. A summary of the GC results is presented in Table B.1, followed by the raw data.



**THIS PAGE INTENTIONALLY LEFT BLANK**

**Table B.1**  
**Field Gas Chromatograph Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Boring	Sample Interval (ft. BLS)	Sample Mass (grams)	Concentrations (ppb)					
			Benzene	Toluene	Ethyl- benzene	m,p- Xylene	o- Xylene	Total BTEX
4 May 1995								
100 ppb BTEX	—	—	100	100	100	200	100	600
1 ppm BTEX	—	—	1,000	1,000	1,000	2,000	1,000	6,000
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	10	4	8	14	9	45
026-004BH	0.5'-2.5'	10	11	4	5	9	4	33
	5'-7'	10	7	3	2	5	2	19
	8'-10'	10	1	2	2	4	3	12
026-001BH	0.5'-2.5'	10	7	1	3	17	26	54
	5'-7'	10	ND	2	ND	ND	ND	2
100 ppb BTEX	—	—	100	102	101	211	105	619
Air Blank	—	—	ND	1	ND	ND	ND	1
026-004BH Reshot	0.5'-2.5'	10	ND	2	1	14	11	28
026-001BH	8'-10'	10	ND	2	2	11	5	20
026-005BH	1.0'-1.5'	10	ND	2	ND	5	3	10
	6'-6.5'	10	ND	2	2	5	ND	9
	10'	10	ND	1	ND	2	1	4
100 ppb BTEX	—	—	93	89	83	171	95	531
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	ND	ND	1	ND	ND	1
026-006BH	0.5'-2.5'	10	7	2	2	4	4	19
	6'-6.5'	10	ND	1	ND	3	ND	4
	11'-11.5'	10	5	2	ND	4	2	13
026-002BH	0.5'-2.5'	10	ND	2	1	2	ND	5
	5'-7'	10	ND	1	ND	ND	ND	1
100 ppb BTEX	—	—	90	81	81	159	73	483
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	ND	ND	1	ND	ND	1
026-003BH	0.5'-2.5'	10	ND	2	1	8	2	13
	5'-7'	10	ND	2	ND	4	ND	6

**Table B.1 (Continued)**  
**Field Gas Chromatograph Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Boring	Sample Interval (ft. BLS)	Sample Mass (grams)	Concentrations (ppb)					
			Benzene	Toluene	Ethyl- benzene	m,p- Xylene	o- Xylene	Total BTEX
4 May 1995 (Concluded)								
100 ppb BTEX	— —	— —	109 100	96 100	95 100	181 200	88 100	569 600
5 May 1995								
1 ppm BTEX	—	—	1,000	1,000	1,000	1,000	1,000	5,000
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
1 ppm BTEX	—	—	1,000	1,000	1,000	2,000	1,000	6,000
Air Blank	—	—	4	4	6	13	ND	27
026-001MW	1'-2'	10	ND	3	ND	ND	ND	3
	5'-7'	10	4	3	3	6	ND	16
	10'-12'	10	3	3	2	6	5	19
	12.5'-14.5'	10	3	3	3	9	8	26
	15'-17'	10	ND	ND	6	13	ND	19
100 ppb BTEX	—	—	100	96	106	216	115	633
Air Blank	—	—	ND	1	ND	ND	ND	1
026-001MW	20'-22'	10	ND	2	1	4	ND	7
	24'-26'	10	ND	2	1	3	ND	6
100 ppb BTEX	—	—	84	90	102	215	174	665
	—	—	100	100	100	200	100	600
6 May 1995								
1 ppm BTEX	—	—	1,000	1,000	1,000	2,000	1,000	6,000
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	4	3	8	21	ND	36
026-003MW	0.5'-2.5'	10	5	4	6	26	5	46
	5'-7'	10	3	3	10	25	27	68
	10'-12'	10	3	3	11	32	28	77
026-002MW	0.5'-2.5'	10	ND	3	12	31	32	78
	5'-7'	10	ND	2	3	15	17	37
100 ppb BTEX	—	—	100	90	86	169	78	523
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	ND	1	ND	ND	ND	1
026-002MW	10'-12'	10	1	3	3	9	7	23
	15'-17'	10	3	3	2	7	4	19

**Table B.1 (Continued)**  
**Field Gas Chromatograph Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Boring	Sample Interval (ft. BLS)	Sample Mass (grams)	Concentrations (ppb)					
			Benzene	Toluene	Ethyl- benzene	m,p- Xylene	o- Xylene	Total BTEX
6 May 1995 (Concluded)								
100 ppb BTEX	— —	— —	100 100	94 100	91 100	185 200	97 100	567 600
8 May 1995								
1 ppm BTEX	—	—	1,000	1,020	1,010	2,030	1,290	6,350
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	2	8	7	13	14	44
026-002MW	20'-22'	10	4	6	7	13	11	41
100 ppb BTEX	— —	— —	99 100	80 100	72 100	133 200	47 100	431 600
11 May 1995								
1 ppm BTEX	—	—	1,000	1,000	1,000	2,000	1,000	6,000
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	8	18	22	51	21	120
025-001MW	0.5'-2.5'	10	6	6	8	18	ND	38
	5'-7'	10	1	4	8	21	ND	34
	10'-12'	10	2	4	13	19	ND	38
	15'-17'	10	1	4	3	11	ND	19
	20'-22'	10	1	4	3	8	ND	16
100 ppb BTEX	—	—	91	87	89	193	87	547
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	ND	2	2	ND	ND	4
025-001MW	25'-27'	10	3	4	2	5	ND	14
	30'-32'	10	3	4	5	9	ND	21
	35'-37'	10	ND	4	18	29	ND	51
025-002MW	0.5'-2.5'	10	ND	4	2	7	ND	13
	5'-7'	10	3	4	1	3	ND	11
100 ppb BTEX	—	—	108	104	104	212	108	636
Air Blank	—	—	ND	1	1	ND	ND	2
025-002MW	10'-12'	10	4	4	2	7	4	21
	15'-17'	10	ND	4	1	4	3	12
100 ppb BTEX	—	—	86	85	81	166	83	501

**Table B.1 (Continued)**  
**Field Gas Chromatograph Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Boring	Sample Interval (ft. BLS)	Sample Mass (grams)	Concentrations (ppb)					
			Benzene	Toluene	Ethyl- benzene	m,p- Xylene	o- Xylene	Total BTEX
11 May 1995 (Concluded)								
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	ND	1	ND	27	ND	28
025-003MW	0.5'-2.5'	10	ND	5	3	13	9	30
	5'-7'	10	25	4	2	15	ND	46
	10'-12'	10	774	350	297	1,840	827	4,090
025-003MW Reshot	10'-12'	10	665	515	540	2,220	985	4,930
025-003MW	15'-17'	10	2,220	140	ND	ND	ND	2,360
1 ppm BTEX	—	—	696	679	658	1,389	586	4,008
Recal	—	—	1,000	1,000	1,000	2,000	1,000	6,000
Air Blank	—	—	ND	1	1	3	ND	5
025-003MW	20'-22'	10	149	15	9	25	16	214
Air Blank	—	—	ND	1	1	2	ND	4
13 May 1995								
100 ppb BTEX	—	—	100	100	100	200	100	600
1 ppm BTEX	—	—	1,000	1,000	1,000	2,000	1,000	6,000
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	4	3	8	14	ND	29
025-009BH	0.5'-2.5'	10	4	4	4	9	ND	21
	5'-7'	10	3	4	3	2	ND	12
	10'-12'	10	3	3	ND	ND	ND	6
025-011BH	0.5'-2.5'	10	2	3	1	4	ND	10
	5'-7'	10	ND	4	2	6	ND	12
100 ppb BTEX	—	—	106	100	101	207	99	613
Air Blank	—	—	ND	1	ND	3	ND	4
025-008BH	0.5'-2.5' 7'-9'	10 10	ND 36	3 92	1 635	3 645	ND 9,450	7 10,858
025-008BH Reshot	7'-9'	10	35	110	630	790	4,030	5,595
025-008BH	9'-11'	10	ND	ND	ND	ND	ND	ND

**Table B.1 (Continued)**  
**Field Gas Chromatograph Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Boring	Sample Interval (ft. BLS)	Sample Mass (grams)	Concentrations (ppb)					
			Benzene	Toluene	Ethyl- benzene	m,p- Xylene	o- Xylene	Total BTEX
13 May 1995 (Concluded)								
025-008BH Reshot	9'-11'	10	4	4	12	ND	60	80
100 ppb BTEX	—	—	108	95	101	214	144	662
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	1	2	1	2	ND	6
025-008BH	13'-15'	10	ND	3	2	ND	ND	5
025-010BH	0.5'-2.5'	10	ND	3	7	17	9	36
	5'-7'	10	3	3	1	3	2	12
025-006BH	0.5'-2.5'	10	ND	3	1	3	1	8
	5'-7'	10	ND	3	1	3	1	8
100 ppb BTEX	—	—	89	97	88	159	34	467
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	ND	12	ND	3	ND	15
025-006BH	10'-12'	10	ND	5	5	ND	14	24
	20'-22'	10	3	32	35	ND	78	148
100 ppb BTEX	—	—	93	92	96	193	101	575
	—	—	100	100	100	200	100	600
15 May 1995								
1 ppm BTEX	—	—	1,000	1,000	1,000	2,000	1,000	6,000
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	2	1	3	4	ND	10
1 ppm BTEX	—	—	827	778	664	1,300	632	4,201
Recal	—	—	1,000	1,000	1,000	2,000	1,000	6,000
Air Blank	—	—	1	2	3	3	ND	9
025-003BH	0.5'-2.5' 5'-7'	10 10	7 ND	10 ND	41 3,620	ND 35,650	82 15,050	140 54,320
025-003BH Re-Reshot	5'-7'	10	ND	23,950	3,740	13,700	20,150	61,540
025-003BH	10'-12'	10	ND	47,550	5,200	36,450	27,000	116,200
10 ppm BTEX	—	—	8,720	8,470	5,510	11,620	5,810	40,130

**Table B.1 (Continued)**  
**Field Gas Chromatograph Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Boring	Sample Interval (ft. BLS)	Sample Mass (grams)	Concentrations (ppb)					
			Benzene	Toluene	Ethyl- benzene	m,p- Xylene	o- Xylene	Total BTEX
15 May 1995 (Concluded)								
Recal	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	11	5	11	25	ND	52
025-003BH	15'-17' 20'-22'	10	140	215	205	1,140	420	2,120
		10	276	314	246	1,832	1,110	3,778
025-003BH Reshot	25'	10	20	276	42	364	47	749
025-002BH	0.5'-2.5'	10	13	152	12	31	ND	208
1 ppm BTEX	—	—	900	828	718	1,440	824	4,710
Recal	—	—	1,000	1,000	1,000	2,000	1,000	6,000
Air Blank	—	—	ND	2	3	6	ND	11
025-002BH Reshot	5'-7'	10	5,800,000	263,000	25,500	205,000	114,000	6,407,500
025-002BH	10'-12'	10	20,200	214,000	2,700	156,000	104,000	496,900
025-002BH Re-Reshot	5'-7'	10	73,800	209,000	3,360	145,000	93,000	524,160
10 ppm BTEX	—	—	9,050	8,790	8,290	16,840	8,390	51,360
Recal	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	11	38	41	521	103	714
	—	—	3	4	1	3	ND	11
025-001BH	0.5'-2.5' 5'-7'	10 10	60 ND	207 613,000	27 6,600	107 387,000	ND 180,000	401 1,186,600
10 ppm BTEX	—	—	10,940	9,800	8,540	16,560	7,750	53,590
16 May 1995								
100 ppb BTEX	—	—	100	100	100	200	100	600
1 ppm BTEX	—	—	1,000	1,000	1,000	2,000	1,010	6,010
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	ND	9	5	6	ND	20

**Table B.1 (Continued)**  
**Field Gas Chromatograph Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Boring	Sample Interval (ft. BLS)	Sample Mass (grams)	Concentrations (ppb)					
			Benzene	Toluene	Ethyl- benzene	m,p- Xylene	o- Xylene	Total BTEX
16 May 1995 (Concluded)								
025-007BH	0.5'-2.5'	10	2	6	1	3	ND	12
	5'-7'	10	5	12	5	14	ND	36
	10'-12'	10	4	4	ND	ND	ND	8
	15'-17'	10	4	11	1	ND	ND	16
	20'-22'	10	ND	4	1	ND	21	26
100 ppb BTEX	—	—	101	83	54	75	1	314
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	ND	5	ND	ND	ND	5
025-005BH	0.5'-2.5'	10	2	4	ND	9	ND	14
	10'-12'	10	ND	4	2	ND	ND	6
	20'-22'	10	3	4	1	9	ND	17
025-004BH	0.5'-2.5'	10	ND	4	ND	ND	ND	4
	5'-7'	10	2	4	10	178	157	351
100 ppb BTEX	—	—	100	100	100	200	100	600
1 ppm BTEX	—	—	1,000	1,000	1,000	2,000	1,000	6,000
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	1	1	6	9	ND	17
025-004BH	10'-12'	10	1	4	4	8	ND	17
	18'-20'	10	1	3	ND	ND	ND	4
025-004BH Reshot	5'-7'	10	1	3	2	6	ND	12
100 ppb BTEX	—	—	106	103	98	188	68	563
	—	—	100	100	100	200	100	600
17 May 1995								
1 ppm BTEX	—	—	1,000	1,000	1,000	2,000	1,000	6,000
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	1	12	ND	83	20	116
100 ppb BTEX	—	—	97	70	62	119	51	399
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	3	ND	1	ND	ND	4
025-012BH	0.5'-2.5'	10	3	21	17	ND	39	80
	5'-7'	10	ND	ND	ND	ND	ND	ND



**Table B.1 (Concluded)**  
**Field Gas Chromatograph Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Boring	Sample Interval (ft. BLS)	Sample Mass (grams)	Concentrations (ppb)					
			Benzene	Toluene	Ethyl- benzene	m,p- Xylene	o- Xylene	Total BTEX
17 May 1995 (Concluded)								
025-012BH Reshot	5'-7'	10	ND	ND	ND	ND	ND	ND
025-012BH	10'-12' 18'-20'	10 10	48 41	31 46	4 ND	ND ND	14 ND	97 87
100 ppb BTEX	—	—	77	84	80	151	78	470
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	3	ND	1	ND	73	77
025-013BH	0.5'-2.5'	10	4	3	1	3	ND	11
	5'-7'	10	3	2	20	ND	106	131
	10'-12'	10	4	2	4	2	ND	12
	18'-20'	10	10	17	3	ND	4	34
100 ppb BTEX	— —	— —	96 100	92 100	87 100	178 200	93 100	546 600
20 May 1995								
1 ppm BTEX	—	—	1,000	1,000	1,000	2,000	1,000	6,000
10 ppm BTEX	—	—	10,000	10,000	10,000	20,000	10,000	60,000
Air Blank	—	—	13	5	28	40	95	181
026-001MW	Water	10 ml	10	2	3	ND	ND	15
026-002MW	Water	10 ml	1	ND	ND	ND	ND	1
026-003MW	Water	10 ml	ND	ND	ND	ND	ND	ND
025-001MW	Water	10 ml	ND	ND	ND	ND	ND	ND
025-002MW	Water	10 ml	4	ND	ND	ND	ND	4
100 ppb BTEX	—	—	109	97	92	178	77	553
Recal	—	—	100	100	100	200	100	600
Air Blank	—	—	ND	ND	ND	ND	ND	ND
025-003MW	Water	10 ml	1,920	963	318	1,400	1,090	5,690
1 ppm BTEX	—	—	1,020	1,040	1,110	2,300	1,130	6,600

MW – Monitor Well.  
 BH – Borehole.  
 ml – milliliters.  
 Recal – Recalibration.

ppb – parts per billion.  
 ppm – parts per million.  
 ND – Non-Detect.

ft. BLS – feet Below Land Surface.  
 BTEX – Benzene, Toluene,  
 Ethylbenzene, and Xylenes.

**Table B.2**  
**PID Screening Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth International Airport, Duluth, Minnesota**

Boring	Interval (ft. BLS)	PID Screening Results	ATHA Screening Results
025-01BH	0.5-2.5	0	0
	5.0-7.0	742	1,096
025-02BH	0.5-2.5	0	58
	5.0-7.0	541	1,391
	10.0-12.0	330	1,339
025-03BH	0.5-2.5	0	0
	5.0-7.0	0	467
	10.0-12.0	273	727
	15.0-17.0	133	53
	20.0-22.0	9.5	10.6
	23.0-25.0	0	0
025-04BH	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0	0
	18.0-20.0	0	0
025-05BH	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0	0
	20.0-22.0	0	0
025-06BH	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	NA	NA
	20.0-22.0	0.7	0
025-07BH	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0	0
	15.0-17.0	0	0
	20.0-22.0	0	0
025-08BH	0.5-2.5	0	0
	7.0-9.0	2	12.4
	9.0-11.0	0.5	0
	13.0-15.0	0	0
025-09BH	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0	0
	13.0-15.0	0	0
025-10BH	0.5-2.5	0	NA
	5.0-7.0	0	0
025-11BH	0.5-2.5	0	0
	5.0-7.0	0	NA

**Table B.2 (Continued)**  
**PID Screening Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

<b>Boring</b>	<b>Interval (ft. BLS)</b>	<b>PID Screening Results</b>	<b>ATHA Screening Results</b>
025-12BH	0.5-2.5	0	2.8
	5.0-7.0	9.6	6.9
	10.0-12.0	7.5	6.5
	18.0-20.0	4.5	3.2
025-13BH	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0	0
	18.0-20.0	0	10.6
025-01MW	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0	0
	15.0-17.0	0	0
	20.0-22.0	0	0
	25.0-27.0	0	0
	30.0-32.0	0	0
	35.0-37.0	0	0
025-02MW	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0	0
	15.0-17.0	0	0
025-03MW	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0.8	25.8
	15.0-17.0	15.6	5
	20.0-22.0	0	0.8
026-01BH	0.5-2.5	0	0
	5.0-7.0	0	0
	8.0-10.0	0	0
026-02BH	0.5-2.5	0	0
	5.0-7.0	0	0
026-03BH	0.5-2.5	0	0
	5.0-7.0	0	0
026-04BH	0.5-2.5	0	0
	5.0-7.0	0	0
	8.0-10.0	0	0.2
026-05BH	0.5-2.5	0	0
	5.0-7.0	0	0
	8.0-10.0	0	0.3

**Table B.2 (Concluded)**  
**PID Screening Results – IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Boring	Interval (ft. BLS)	PID Screening Results	ATHA Screening Results
026-06BH	0.5-2.5	0	0
	5.0-7.0	0	0
	8.0-10.0	0	0
	10.0-12.0	0	0
026-01MW	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0	0
	12.5-14.5	0	0
	15.0-17.0	0	0
	20.0-22.0	0	0
	24.0-26.0	NA	NA
026-02MW	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0	0
	15.0-17.0	NA	NA
	20.0-22.0	NA	NA
026-03MW	0.5-2.5	0	0
	5.0-7.0	0	0
	10.0-12.0	0	0
	15.0-17.0	0	0

MW – Monitor Well.

BH – Borehole.

ft. BLS – feet Below Land Surface.

PID – Photoionization Detector.

ATHA – Ambient Temperature Headspace Analysis.

NA – Not Analyzed.

**THIS PAGE INTENTIONALLY LEFT BLANK**

## ANALYSIS #1

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 10 MV)

TIME PRINTED: MAY 4,95 12:03

SAMPLE TIME: MAY 4,95 11:55

## METHOD

SLOPE UP 1.000 MV/SEC

SLOPE DOWN 3.000 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 12 ML/MIN

B/F FLOW 12 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 29 C

MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

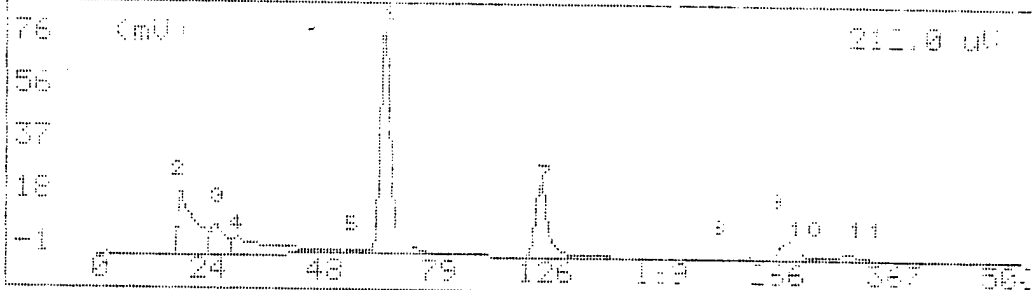
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.058 MVS	15.0
2	UNKNOWN	81.39 MVS	16.6
3	UNKNOWN	32.20 MVS	23.7
4	UNKNOWN	62.06 MVS	28.2
5	UNKNOWN	6.436 MVS	51.3
6	UNKNOWN	218.4 MVS	58.5
7	UNKNOWN	161.5 MVS	117.3
8	UNKNOWN	0.852 MVS	215.8
9	UNKNOWN	117.2 MVS	242.6
10	UNKNOWN	100.4 MVS	261.0
11	UNKNOWN	34.73 MVS	309.3

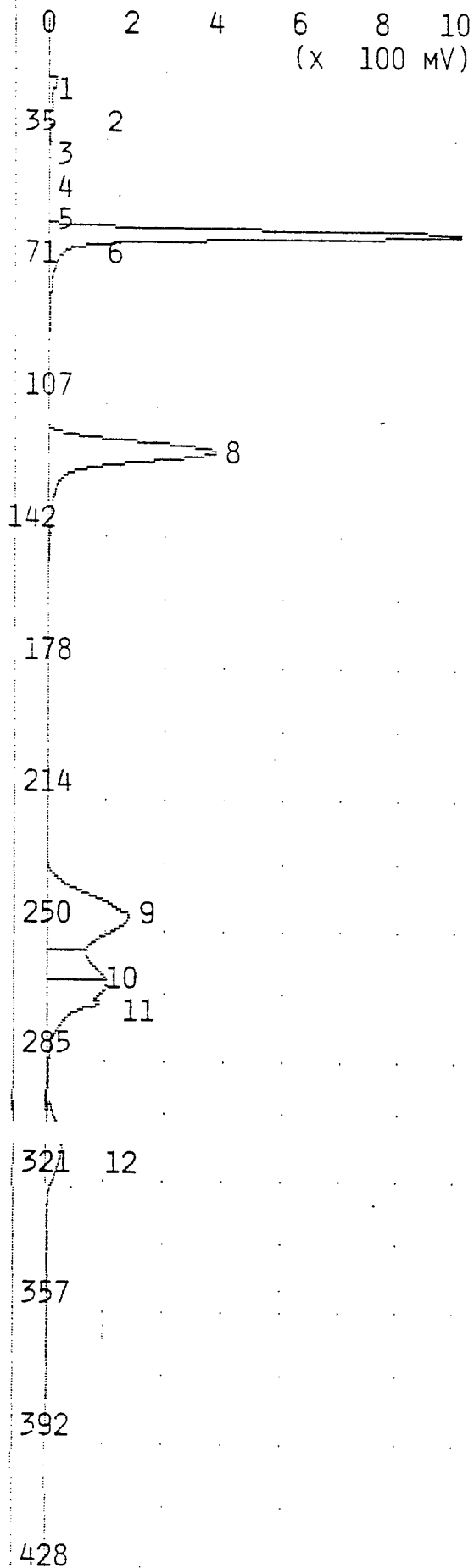
## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

G.C. Ready		105-30 Function	4.95	12:11
Analysis No 1		Run at	95	11:55
Pk No	Name	Conc/Area	Unit	Ret. Time
1	Unknown	12.20	mV	21.2
2	Unknown	11.06	mV	21.2
3	Unknown	11.45	mV	21.2
4	benzene	100.0	ppb	21.2
5	toluene	100.0	ppb	21.2
6	Unknown	100.0	mV	21.2
7	ethylbenzene	100.0	ppb	21.2
8	m,p-xylene	100.0	ppb	21.2
9	o-xylene	100.0	ppb	21.2
- Detected 11 peaks. Use + + to zoom. [				



## ANALYSIS #2 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 12:22

SAMPLE TIME: MAY 4,95 12:14

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

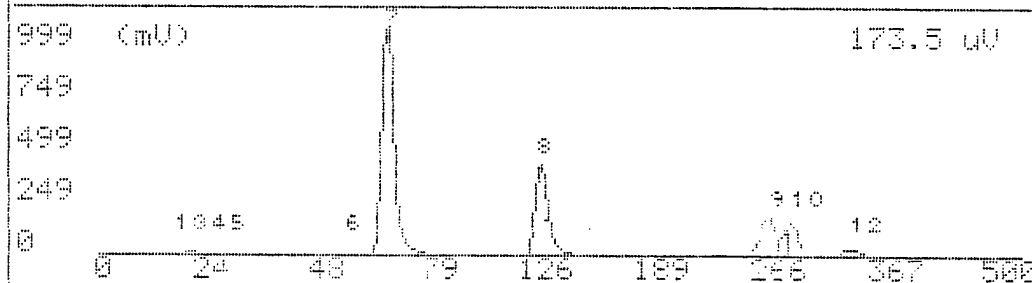
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.068 MVS	14.9
2	UNKNOWN	28.17 MVS	16.6
3	UNKNOWN	66.61 MVS	18.2
4	UNKNOWN	37.96 MVS	23.8
5	UNKNOWN	67.48 MVS	28.2
6	UNKNOWN	5.910 MVS	50.8
7	BENZENE	1.730 PPM	59.0
8	TOLUENE	1.797 PPM	117.7
9	ETHYLBENZENE	2.311 PPM	243.4
10	M,P-XYLENE	1.977 PPM	261.8
11	UNKNOWN	1.319 VSEC	267.7
12	O-XYLENE	2.571 PPM	309.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
1 PPM BTEX



G.C. Ready 195- EC Function: 2 4.95 12:27  
 -- Analysis No 2 -- Run at - May 1.95 12:14  
 Pk No Name Conc/Area Pk Name Ret. time  
 4 Unknown 37.96 mUS - - 27.8 sec  
 5 Unknown 67.49 mUS - - 28.0 sec  
 6 Unknown 5.616 mUS - - 55.3 sec  
 7 Benzene 1.0000 ppm - - 55.3 sec  
 8 toluene 1.0000 ppm - - 111.3 sec  
 9 ethylbenzene 1.0000 ppm - - 240.1 sec  
 10 m,p-xylene 2.0000 ppm - - 261.2 sec  
 11 Unknown 1.319 Usec - - 267.4 sec  
 12 o-xylene 1.0002 ppm - - 309.3 sec  
 - Detected 12 peaks. Use + + to scroll [ 583 sec]



## ANALYSIS #3

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 100 MV)

TIME PRINTED: MAY 4,95 12:38

SAMPLE TIME: MAY 4,95 12:30

## METHOD

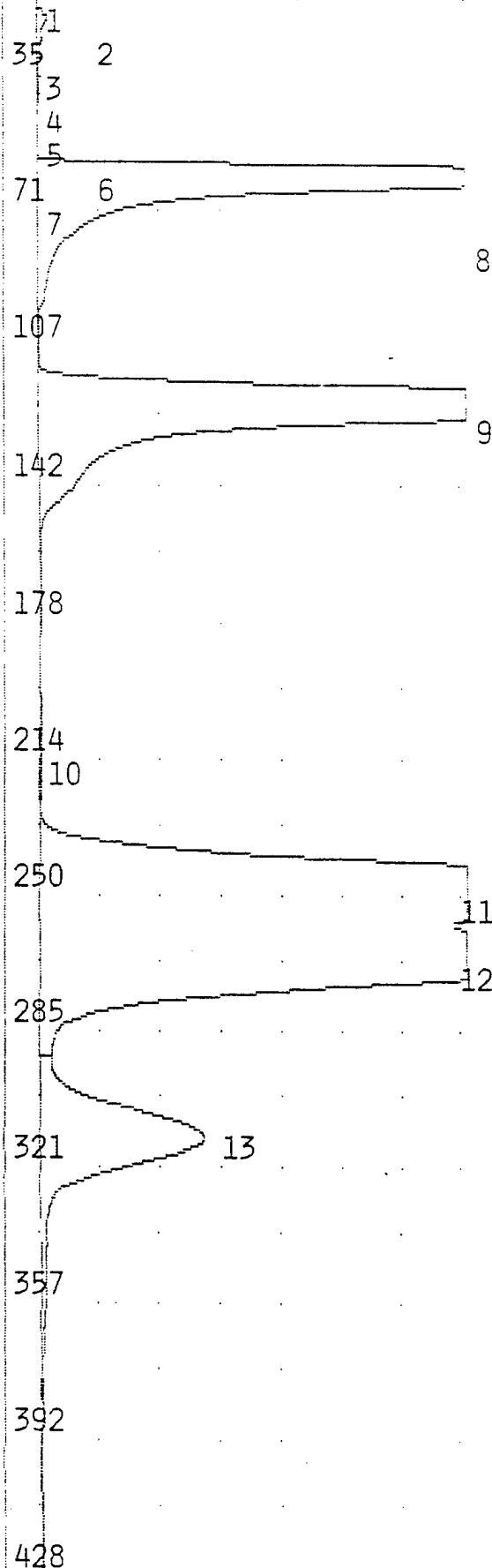
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.082 MVS	15.0
2	UNKNOWN	21.60 MVS	16.8
3	UNKNOWN	98.39 MVS	18.4
4	UNKNOWN	49.99 MVS	24.0
5	UNKNOWN	65.05 MVS	28.4
6	UNKNOWN	11.28 MVS	43.6
7	UNKNOWN	4.007 MVS	51.2
8	BENZENE	5.510 PPM	60.2
9	TOLUENE	8.414 PPM	119.3
10	UNKNOWN	7.344 MVS	211.2
11	ETHYLBENZENE	10.08 PPM	246.6
12	M,P-XYLENE	39.30 PPM	262.9
13	O-XYLENE	7.916 PPM	311.4

## NOTES

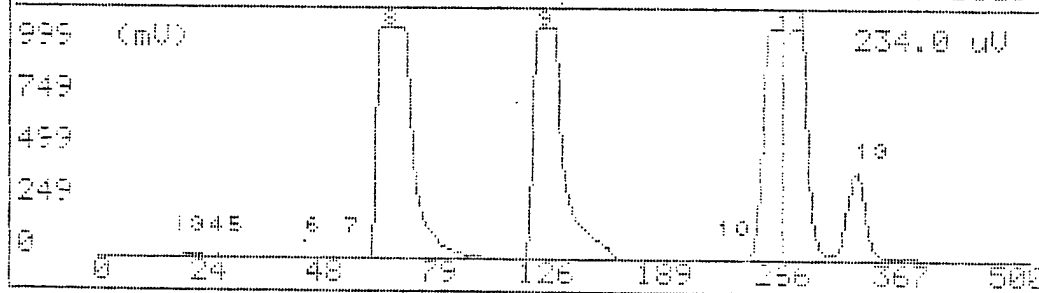
JOE BYRD, JR.  
DULUTH ANGB  
10 PPM BTEX



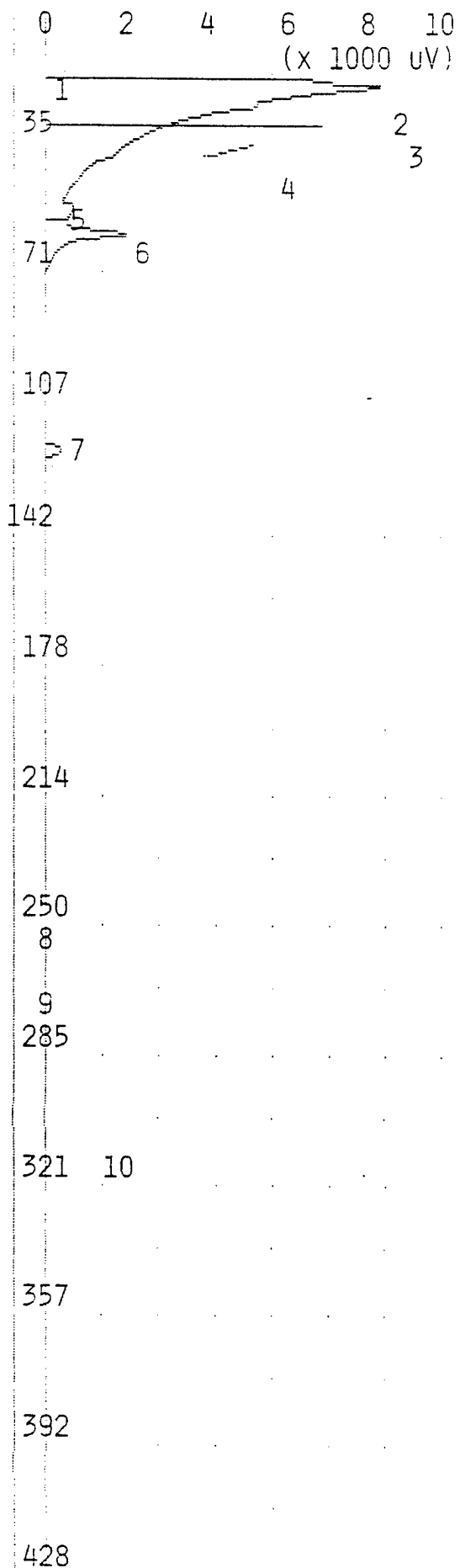
G.C. Ready 108+ GC Function Ver. 4.95 12:44  
 -- Analysis No 3 -- Run at -- Mar. 1, 95 12:30 --  
 Px No Name Conc/Area Alarm Ret. Time

1	Unknown	65.14	mUS	-No-	20.4	sec
2	Unknown	11.35	mUS	-No-	40.6	sec
3	Unknown	4.06	mUS	-No-	51.2	sec
4	benzene	10.00	ppm	-No-	60.2	sec
5	toluene	10.00	ppm	-No-	110.2	sec
6	Unknown	7.34	mUS	-No-	211.2	sec
7	ethylbenzene	10.00	ppm	-No-	240.0	sec
8	m,p-xylene	10.00	ppm	-No-	262.9	sec
9	o-xylene	10.01	ppm	-No-	311.4	sec

- Detected 13 peaks. Use + + to scroll [ 505 sec ]



ANALYSIS #4 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 12:54  
SAMPLE TIME: MAY 4,95 12:46

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

PEAK REPORT

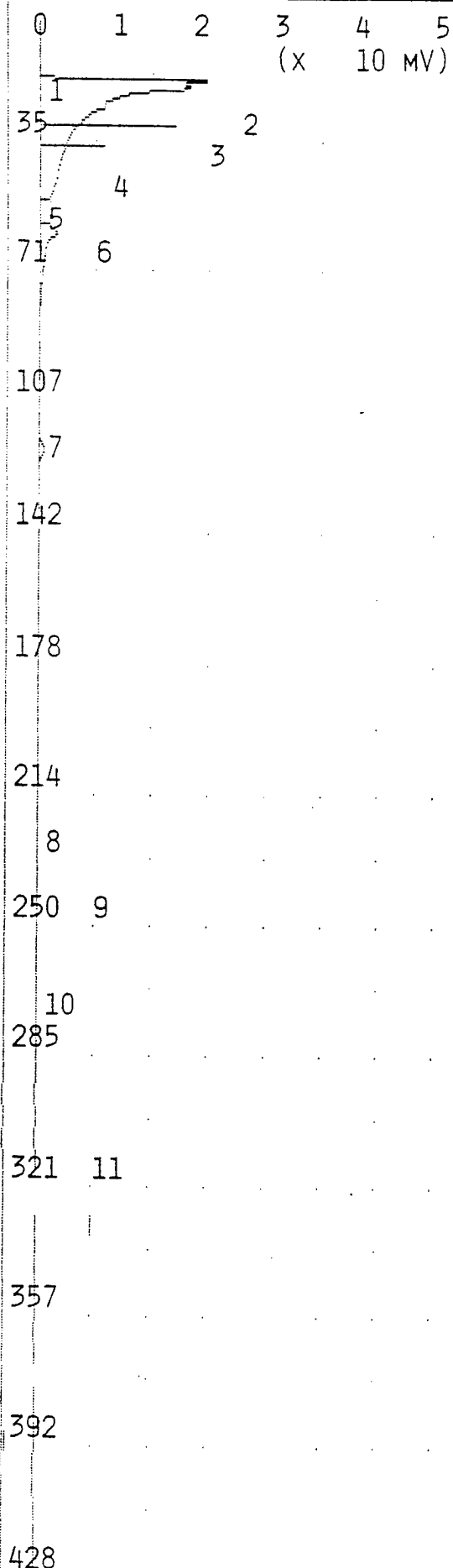
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.061 MVS	14.8
2	UNKNOWN	9.807 MVS	16.8
3	UNKNOWN	110.7 MVS	18.3
4	UNKNOWN	0.645 MVS	23.8
5	UNKNOWN	0.851 MVS	51.3
6	BENZENE	10.25 PPB	58.8
7	TOLUENE	4.357 PPB	117.7
8	ETHYLBENZENE	8.333 PPB	244.2
9	M,P-XYLENE	14.48 PPB	262.1
10	O-XYLENE	9.373 PPB	308.8

NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

## ANALYSIS #5

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 13:06

SAMPLE TIME: MAY 4,95 12:57

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.123 MVS	15.1
2	UNKNOWN	29.36 MVS	16.7
3	UNKNOWN	72.78 MVS	18.2
4	UNKNOWN	102.5 MVS	23.8
5	UNKNOWN	10.26 MVS	50.8
6	BENZENE	10.92 PPB	58.8
7	TOLUENE	3.660 PPB	117.7
8	UNKNOWN	0.853 MVS	220.0
9	ETHYLBENZENE	4.590 PPB	244.0
10	M,P-XYLENE	8.939 PPB	264.0
11	O-XYLENE	3.716 PPB	311.2

## NOTES

JOE BYRD, JR.

DULUTH ANGB

026-004BH 0.5-2.5 16

10g 33

0 1 2 3 4 5  
(x 10 MV)

TIME PRINTED: MAY 4,95 13:18

SAMPLE TIME: MAY 4,95 13:10

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.437 MVS	14.2
2	UNKNOWN	26.13 MVS	16.7
3	UNKNOWN	56.24 MVS	18.2
4	UNKNOWN	94.17 MVS	23.7
5	UNKNOWN	10.21 MVS	50.8
6	BENZENE	7.368 PPB	58.7
7	TOLUENE	3.415 PPB	118.1
8	UNKNOWN	1.338 MVS	217.2
9	ETHYLBENZENE	1.945 PPB	245.3
10	M,P-XYLENE	4.567 PPB	262.6
11	O-XYLENE	2.291 PPB	311.7

## NOTES

JOE BYRD, JR.

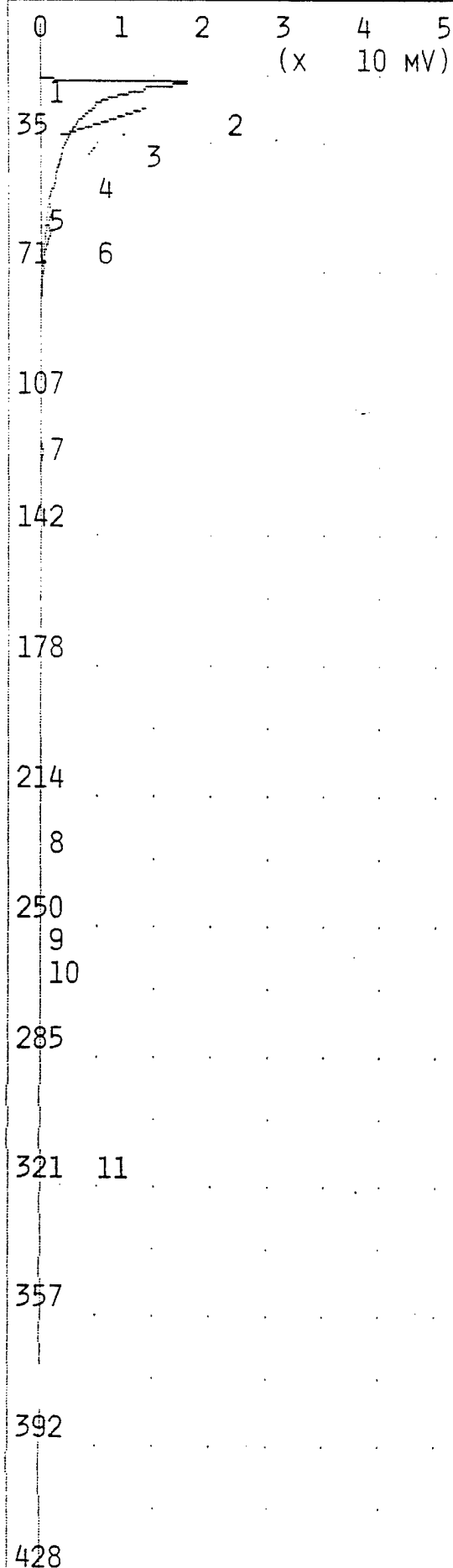
DULUTH ANGB

026-004BH

5.0-7.0 10G

## ANALYSIS #7

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 13:30  
 SAMPLE TIME: MAY 4,95 13:22

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 32 C  
 MAX GAIN 1000  
 ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.136 MVS	15.1
2	UNKNOWN	187.5 MVS	16.8
3	UNKNOWN	1.429 MVS	18.1
4	UNKNOWN	0.261 MVS	23.6
5	UNKNOWN	1.893 MVS	51.2
6	BENZENE	1.171 PPB	59.0
7	TOLUENE	2.182 PPB	118.0
8	UNKNOWN	2.267 MVS	220.2
9	ETHYLBENZENE	1.928 PPB	246.6
10	M,P-XYLENE	4.476 PPB	261.6
11	O-XYLENE	2.643 PPB	308.2

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 026-004BH  
 8.0-10.0 10G

## ANALYSIS #8

## 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 4,95 13:42

SAMPLE TIME: MAY 4,95 13:34

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.094 MVS	14.8
2	UNKNOWN	20.19 MVS	16.7
3	UNKNOWN	133.7 MVS	18.5
4	UNKNOWN	6.334 MVS	51.6
5	BENZENE	6.536 PPB	56.4
6	TOLUENE	1.377 PPB	117.7
7	UNKNOWN	2.237 MVS	156.8
8	UNKNOWN	3.125 MVS	199.0
9	UNKNOWN	7.984 MVS	212.8
10	UNKNOWN	2.627 MVS	239.6
11	UNKNOWN	2.442 MVS	243.7
12	ETHYLBENZENE	3.062 PPB	248.5
13	UNKNOWN	2.040 MVS	253.8
14	M,P-XYLENE	16.95 PPB	261.0
15	UNKNOWN	9.501 MVS	272.2
16	UNKNOWN	2.552 MVS	293.3
17	O-XYLENE	26.25 PPB	311.4
18	UNKNOWN	1.003 MVS	328.5
19	UNKNOWN	0.501 MVS	346.3

## NOTES

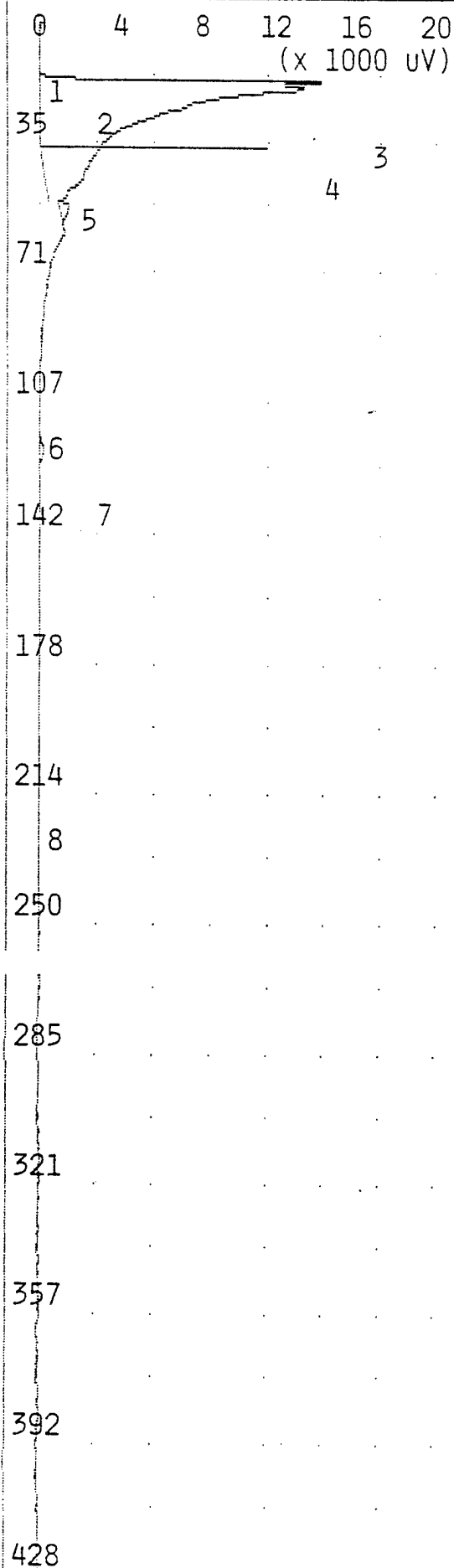
JOE BYRD, JR.

DULUTH ANGB

026-001BH

0.5- 2.5 10G





TIME PRINTED: MAY 4,95 13:55

SAMPLE TIME: MAY 4,95 13:46

## METHOD

SLOPE UP 1.000 MV/SEC  
SLOPE DOWN 3.000 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.073 MVS	13.2
2	UNKNOWN	0.415 MVS	14.8
3	UNKNOWN	18.78 MVS	16.7
4	UNKNOWN	130.6 MVS	18.4
5	UNKNOWN	1.900 MVS	50.8
6	TOLUENE	1.843 PPB	117.4
7	UNKNOWN	0.187 MVS	129.4
8	UNKNOWN	0.915 MVS	217.6

## NOTES

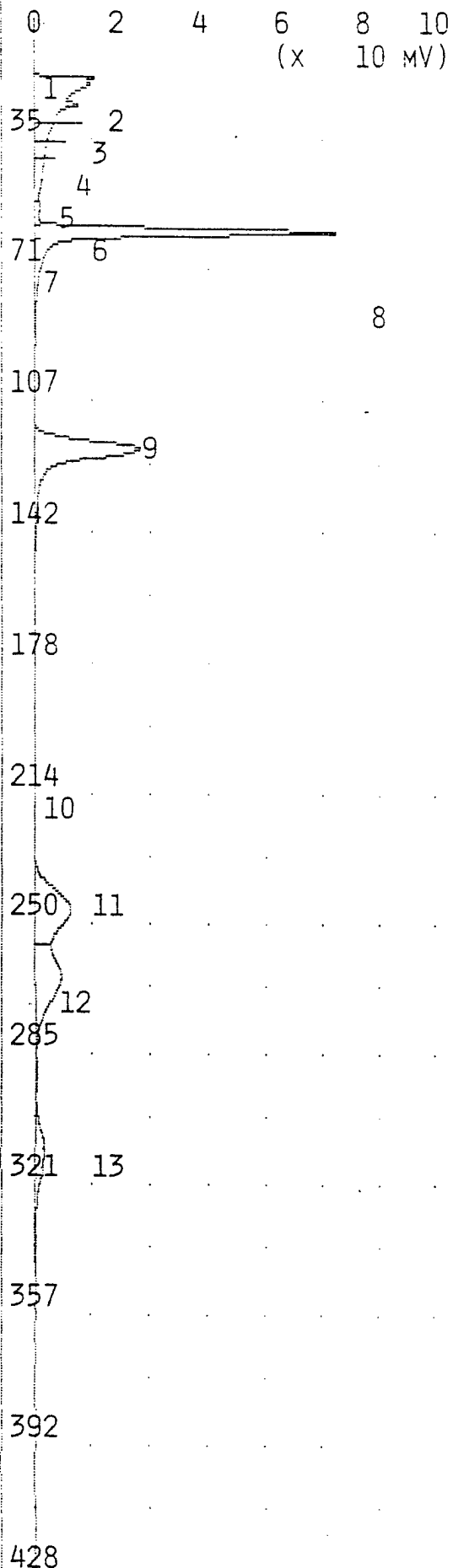
JOE BYRD, JR.

DULUTH ANGB

026-001BH

5.0- 7.0 10G

ANALYSIS #10 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 14:06  
SAMPLE TIME: MAY 4,95 13:58

METHOD

SLOPE UP 1.000 MV/SEC  
SLOPE DOWN 3.000 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

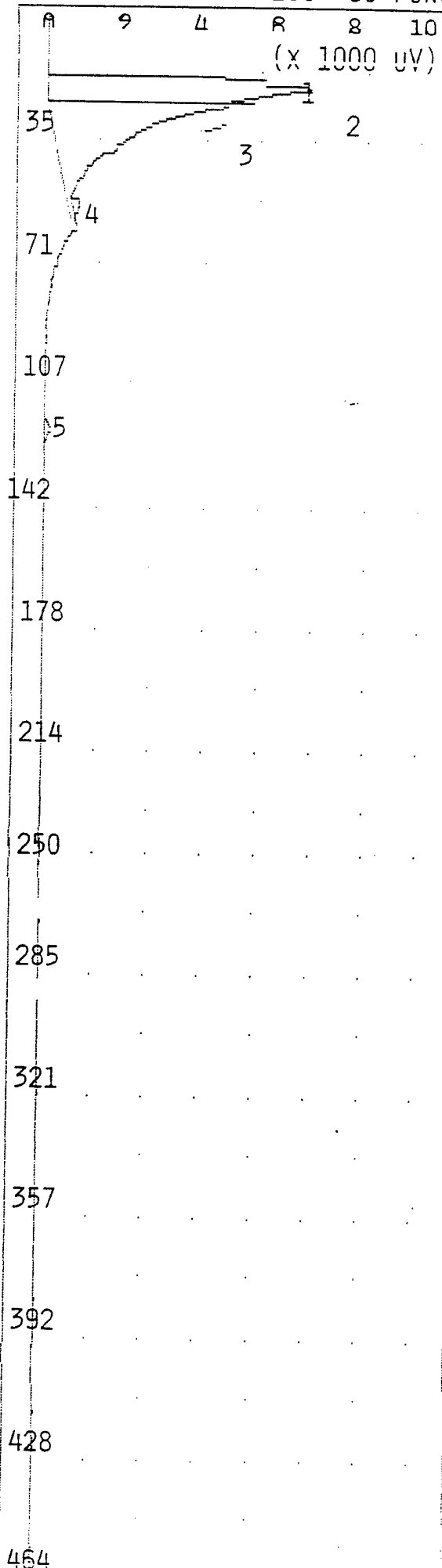
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.188 MVS	15.1
2	UNKNOWN	20.11 MVS	16.8
3	UNKNOWN	57.93 MVS	18.4
4	UNKNOWN	36.16 MVS	23.9
5	UNKNOWN	63.57 MVS	28.2
6	UNKNOWN	0.929 MVS	51.4
7	UNKNOWN	4.714 MVS	52.2
8	BENZENE	99.98 PPB	58.8
9	TOLUENE	101.7 PPB	117.7
10	UNKNOWN	0.518 MVS	214.0
11	ETHYLBENZENE	101.0 PPB	244.0
12	M,P-XYLENE	210.8 PPB	262.6
13	O-XYLENE	105.0 PPB	310.6

NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

# ANALYSIS #11 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4, 95 14:18  
 SAMPLE TIME: MAY 4, 95 14:10

## METHOD

SLOPE UP 1.000 MV/SEC  
 SLOPE DOWN 3.000 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 32 C  
 MAX GAIN 1000  
 ANALYSIS TIME 500.0 SEC

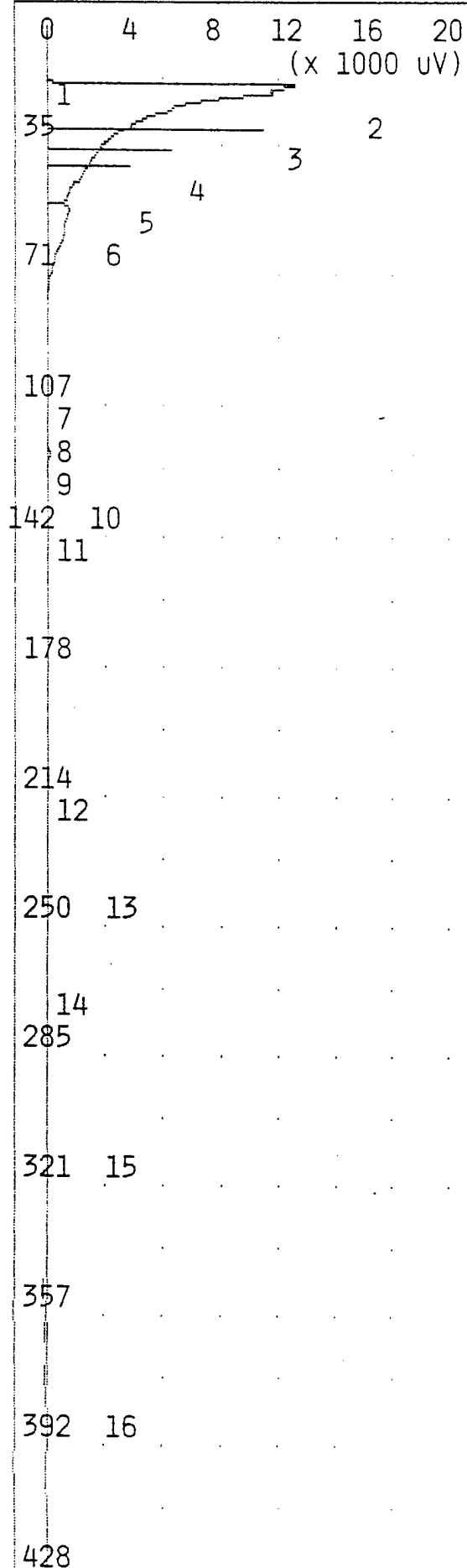
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	7.535 MVS	17.0
2	UNKNOWN	80.74 MVS	18.3
3	UNKNOWN	0.327 MVS	23.7
4	UNKNOWN	0.953 MVS	50.9
5	TOLUENE	1.192 PPB	117.6

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 AIR BLANK

# ANALYSIS #12 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 14:30  
SAMPLE TIME: MAY 4,95 14:22

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 M/SEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

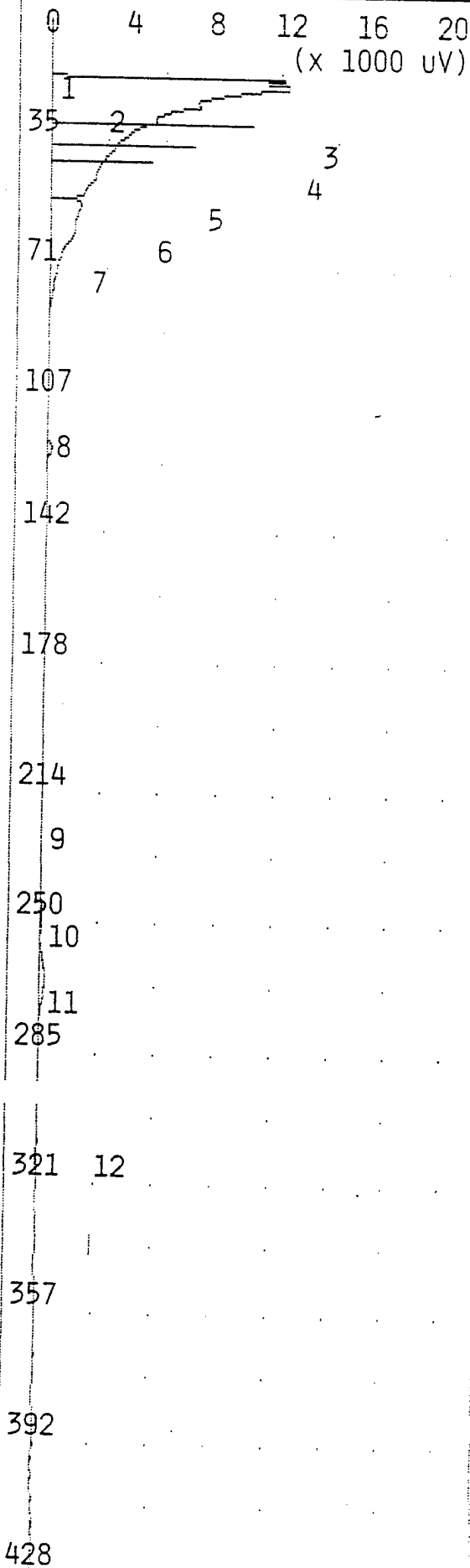
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.234 MVS	15.2
2	UNKNOWN	19.07 MVS	16.8
3	UNKNOWN	48.59 MVS	18.8
4	UNKNOWN	24.11 MVS	23.8
5	UNKNOWN	53.65 MVS	28.2
6	UNKNOWN	19.48 MVS	51.5
7	UNKNOWN	0.081 MVS	109.6
8	TOLUENE	1.932 PPB	118.1
9	UNKNOWN	0.439 MVS	125.8
10	UNKNOWN	0.094 MVS	131.7
11	UNKNOWN	0.041 MVS	135.0
12	UNKNOWN	2.430 MVS	216.4
13	ETHYLBENZENE	1.452 PPB	242.6
14	M,P-XYLENE	14.26 PPB	267.2
15	O-XYLENE	11.15 PPB	311.4
16	UNKNOWN	29.59 MVS	378.6

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-004BH RESHOT  
0.5-2.5 10G

# ANALYSIS #13 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 14:42  
SAMPLE TIME: MAY 4,95 14:34

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

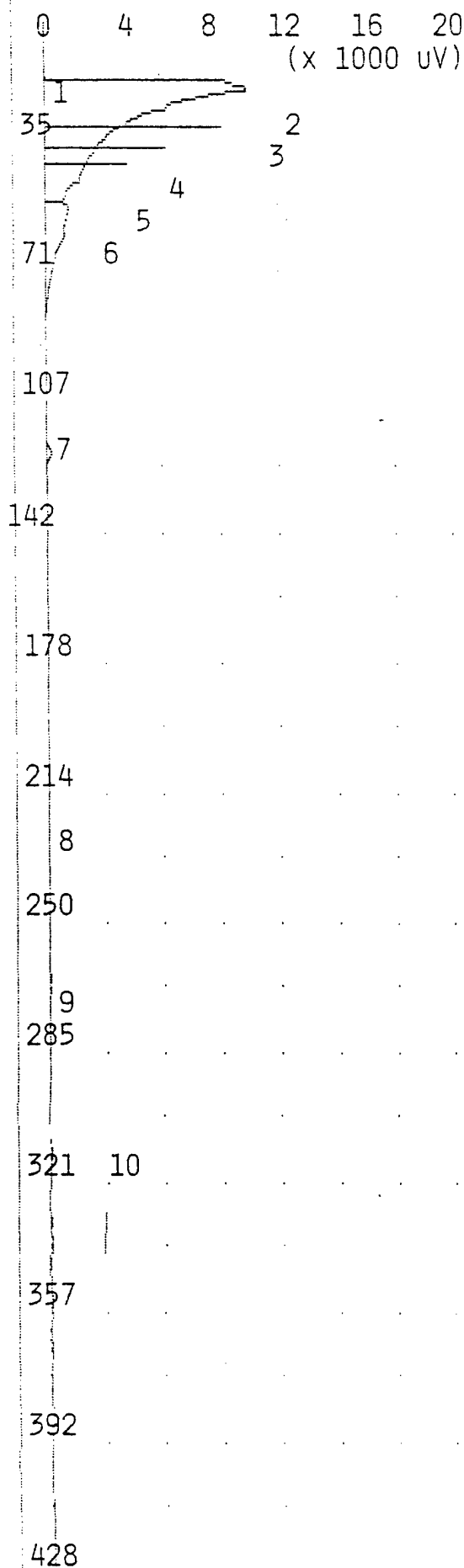
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.085 MVS	12.0
2	UNKNOWN	0.084 MVS	15.2
3	UNKNOWN	16.26 MVS	16.8
4	UNKNOWN	53.37 MVS	18.4
5	UNKNOWN	29.33 MVS	23.8
6	UNKNOWN	68.98 MVS	28.4
7	UNKNOWN	26.22 MVS	51.0
8	TOLUENE	1.859 PPB	118.2
9	UNKNOWN	1.215 MVS	224.0
10	ETHYLBENZENE	2.415 PPB	244.8
11	M,P-XYLENE	10.99 PPB	262.9
12	O-XYLENE	4.920 PPB	309.6

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-001BH  
8.0-10.0 10G

## ANALYSIS #14 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 14:54

SAMPLE TIME: MAY 4,95 14:46

## METHOD

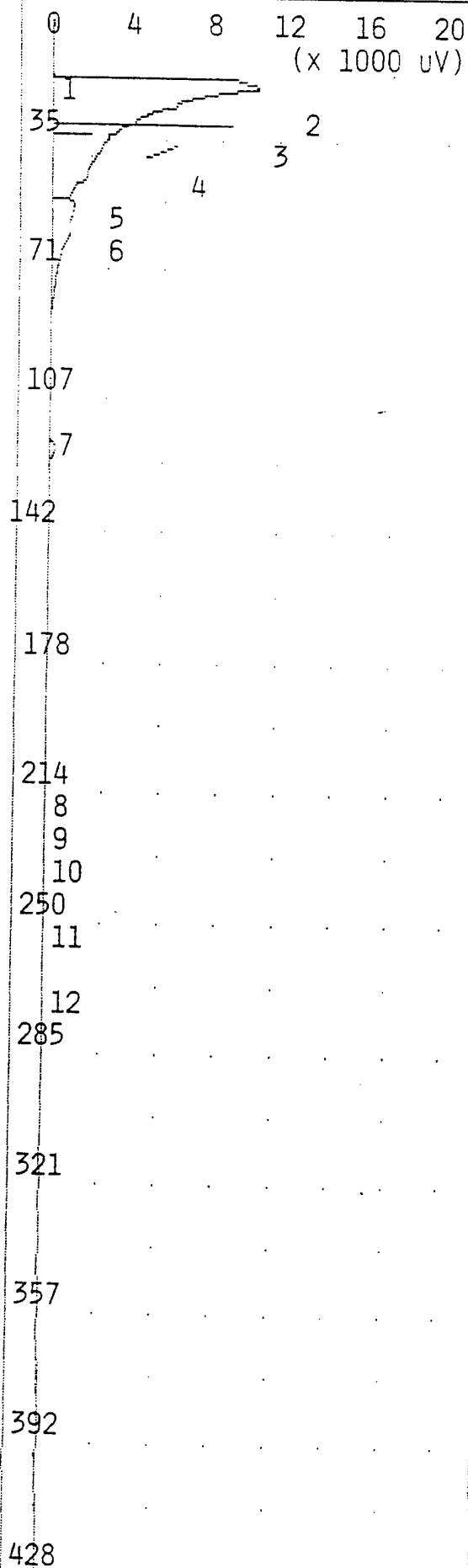
SLOPE UP	0.500	MV/SEC
SLOPE DOWN	1.500	MV/SEC
MIN AREA	0.000	MVSEC
MIN HEIGHT	0.000	MV
ANALYSIS DELAY	0.0	SEC
WINDOW PERCENT	10.0	%
DET FLOW	12	ML/MIN
B/F FLOW	12	ML/MIN
AUX FLOW	0	ML/MIN
OVEN TEMP	40	C
AMB TEMP	31	C
MAX GAIN	1000	
ANALYSIS TIME	500.0	SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.056 MVS	14.8
2	UNKNOWN	13.59 MVS	16.8
3	UNKNOWN	45.94 MVS	18.4
4	UNKNOWN	24.28 MVS	23.6
5	UNKNOWN	50.52 MVS	28.2
6	UNKNOWN	18.28 MVS	51.4
7	TOLUENE	1.567 PPB	118.9
8	UNKNOWN	1.430 MVS	218.6
9	M,P-XYLENE	5.282 PPB	263.2
10	O-XYLENE	2.772 PPB	311.7

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-005BH  
1.0- 1.5 10G



TIME PRINTED: MAY 4, 95 15:06

SAMPLE TIME: MAY 4, 95 14:58

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

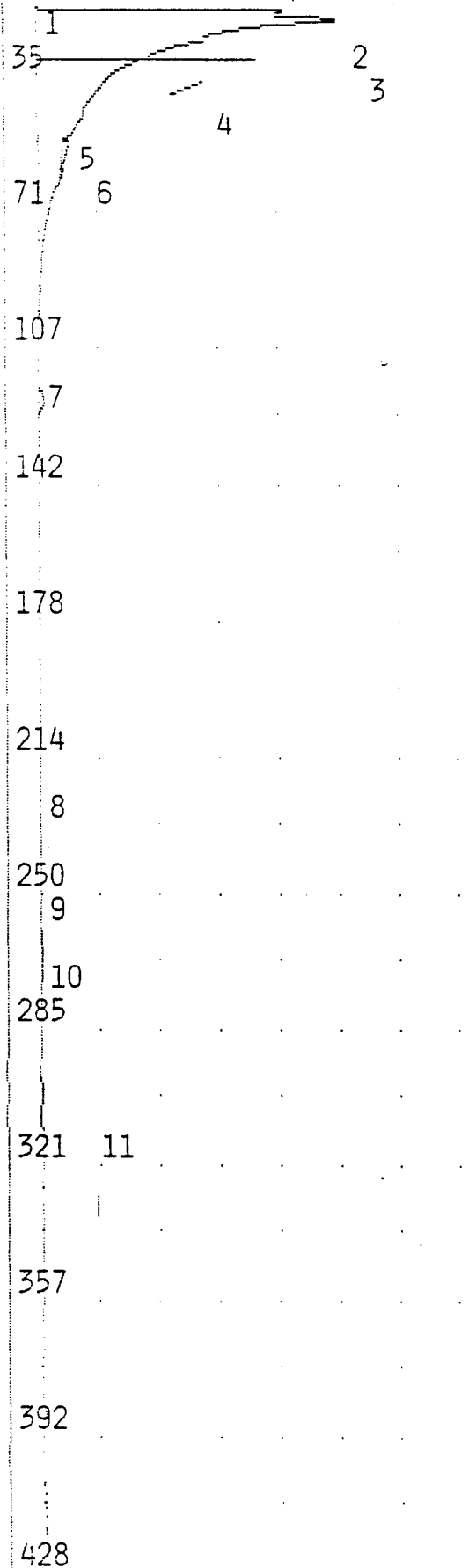
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.055 MVS	15.0
2	UNKNOWN	14.32 MVS	16.8
3	UNKNOWN	86.62 MVS	18.4
4	UNKNOWN	2.331 MVS	23.8
5	UNKNOWN	35.27 MVS	32.4
6	UNKNOWN	17.73 MVS	51.6
7	TOLUENE	1.834 PPB	118.9
8	UNKNOWN	1.032 MVS	215.4
9	UNKNOWN	2.566 MVS	219.6
10	UNKNOWN	3.830 MVS	225.6
11	ETHYLBENZENE	2.298 PPB	247.4
12	M,P-XYLENE	4.692 PPB	265.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-005BH  
6.0- 6.5 10G

## ANALYSIS #16 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 4,95 15:18

SAMPLE TIME: MAY 4,95 15:10

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

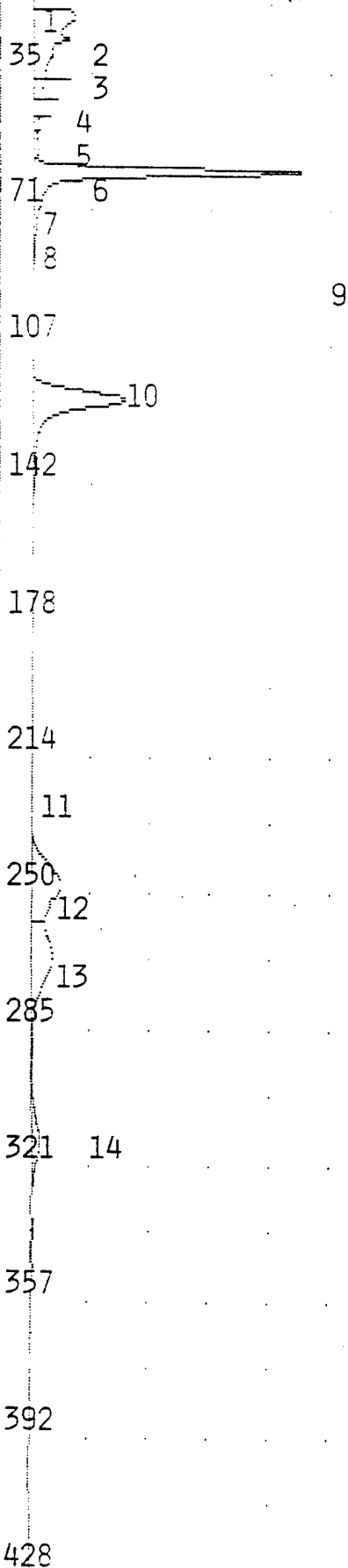
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.071 MVS	14.9
2	UNKNOWN	16.64 MVS	16.8
3	UNKNOWN	184.9 MVS	18.4
4	UNKNOWN	0.728 MVS	23.8
5	UNKNOWN	1.182 MVS	51.0
6	BENZENE	0.063 PPB	58.6
7	TOLUENE	1.379 PPB	118.4
8	UNKNOWN	0.892 MVS	219.6
9	ETHYLBENZENE	0.282 PPB	248.2
10	M,P-XYLENE	2.216 PPB	265.8
11	O-XYLENE	1.157 PPB	307.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-005BH  
10.0 10G



0 2 4 6 8 10  
(x 10 MV)



TIME PRINTED: MAY 4,95 15:30

SAMPLE TIME: MAY 4,95 15:22

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.118 MVS	12.8
2	UNKNOWN	0.121 MVS	15.2
3	UNKNOWN	14.51 MVS	16.8
4	UNKNOWN	46.10 MVS	18.4
5	UNKNOWN	29.96 MVS	24.0
6	UNKNOWN	47.06 MVS	28.5
7	UNKNOWN	11.54 MVS	43.5
8	UNKNOWN	6.932 MVS	51.2
9	BENZENE	92.64 PPB	59.2
10	TOLUENE	88.84 PPB	118.5
11	UNKNOWN	1.017 MVS	222.2
12	ETHYLBENZENE	83.08 PPB	245.0
13	M,P-XYLENE	171.0 PPB	264.2
14	O-XYLENE	94.51 PPB	311.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB

~~026-005BH~~

~~10.0~~ ~~10c~~  
100 ppb BTEX

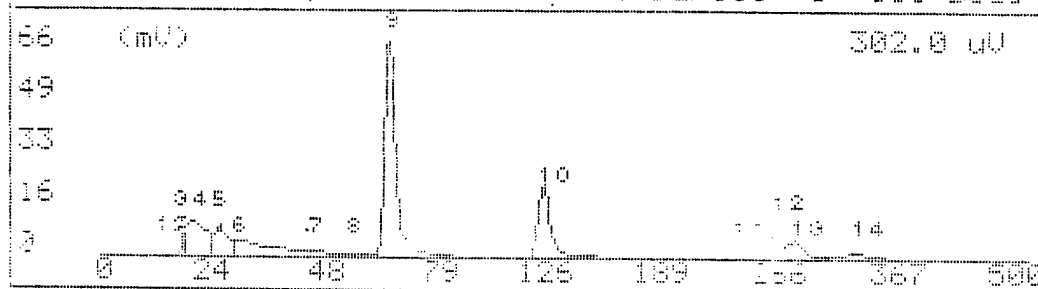
JB

S.C. Ready 18: GC Function 18: 05:05 15:36

-- Analysis No 17 -- Run at -- Mar 1 1991 15:33 --

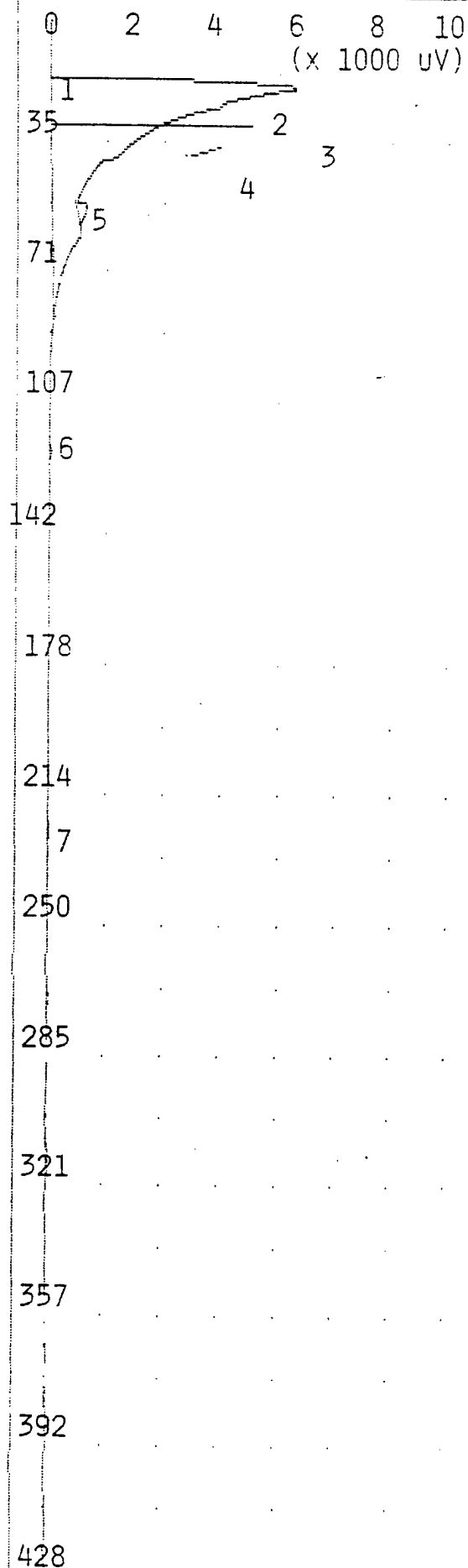
PK No	Name	Conc/Area	Area	Ret. Time
6	Unknown	47.06	mV	20.00
7	Unknown	11.34	mV	20.00
8	Unknown	6.93	mV	20.00
9	benzene	100.00	ppb	20.00
10	toluene	100.00	ppb	20.00
11	Unknown	1.01	mV	20.00
12	ethylbenzene	99.99	ppb	20.00
13	m,p-xylene	200.00	ppb	20.00
14	o-xylene	99.99	ppb	20.00

- Detected 14 peaks. Use +, - to scroll 1 505 sec



## ANALYSIS #18

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 15:53

SAMPLE TIME: MAY 4,95 15:38

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

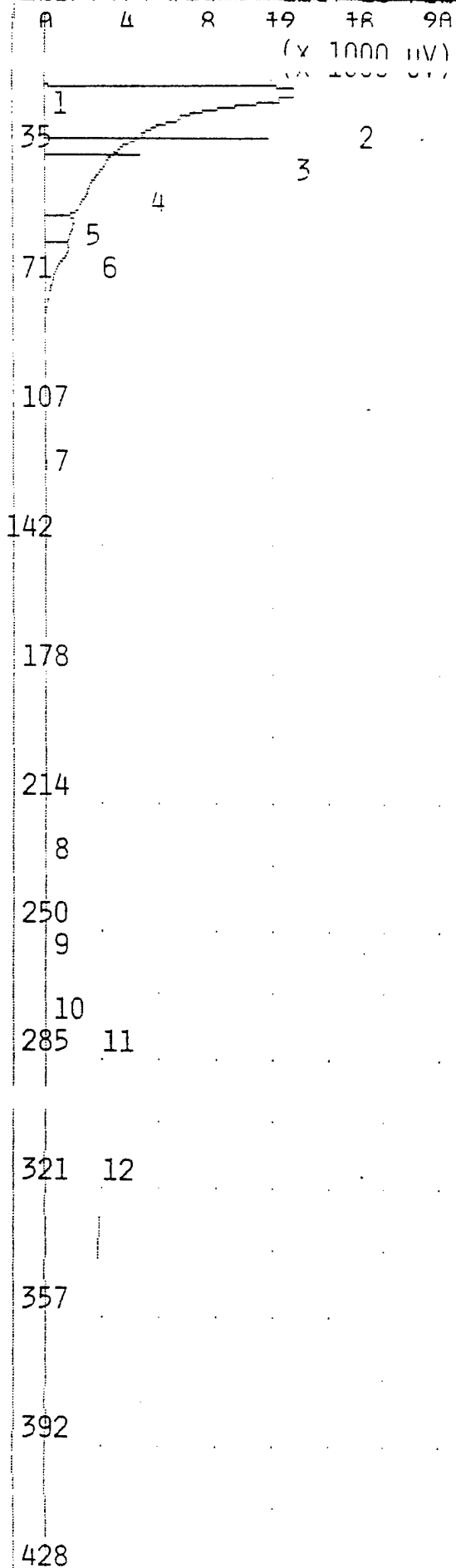
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.090 MVS	14.6
2	UNKNOWN	6.144 MVS	16.9
3	UNKNOWN	97.76 MVS	18.4
4	UNKNOWN	0.285 MVS	23.5
5	UNKNOWN	1.108 MVS	51.5
6	TOLUENE	0.653 PPB	118.5
7	ETHYLBENZENE	1.473 PPB	220.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

# ANALYSIS #10 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTER: MAY 4, 95 15:56  
SAMPLE TIME: MAY 4, 95 15:56

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

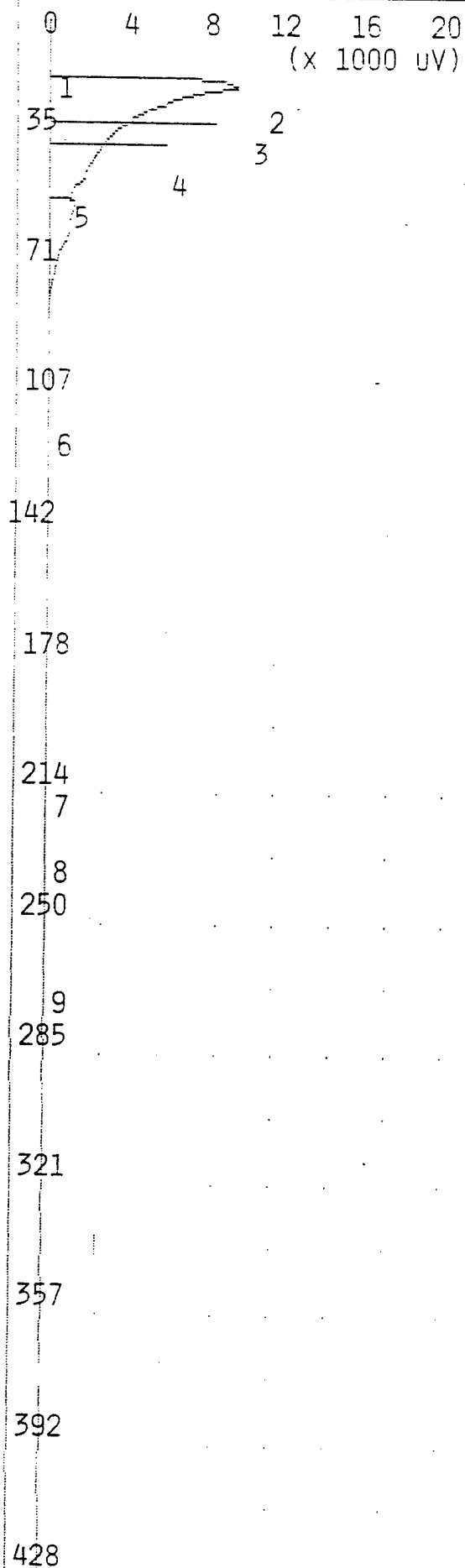
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.076 MVS	15.2
2	UNKNOWN	19.72 MVS	16.9
3	UNKNOWN	80.69 MVS	18.4
4	UNKNOWN	66.59 MVS	28.5
5	UNKNOWN	11.56 MVS	51.4
6	BENZENE	7.335 PPB	59.2
7	TOLUENE	1.900 PPB	118.9
8	UNKNOWN	2.853 MVS	219.6
9	ETHYLBENZENE	1.824 PPB	246.4
10	M,P-XYLENE	3.847 PPB	265.3
11	UNKNOWN	0.309 MVS	273.0
12	O-XYLENE	3.561 PPB	307.4

## NOTES

JOE BYRD, JR.  
DULUTH ANG  
026-006BH  
0.5- 2.5 10G

## ANALYSIS #20

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 16:23  
SAMPLE TIME: MAY 4,95 16:15

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

## PEAK REPORT

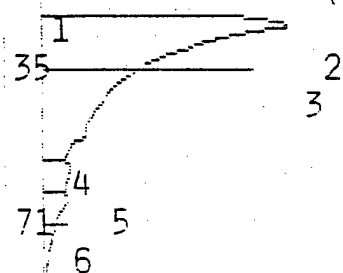
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.044 MVS	14.7
2	UNKNOWN	12.28 MVS	16.9
3	UNKNOWN	45.55 MVS	18.7
4	UNKNOWN	79.58 MVS	23.8
5	UNKNOWN	23.34 MVS	51.2
6	TOLUENE	1.173 PPB	118.8
7	UNKNOWN	0.500 MVS	217.0
8	ETHYLBENZENE	0.263 PPB	227.0
9	M,P-XYLENE	2.936 PPB	265.3

## NOTES

JOE BYRD, JR.  
DULUTH ANG3  
026-006BH

0.5- 2.5 10G

## ANALYSIS #21 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8 12 16 20  
(x 1000 UV)TIME PRINTED: MAY 4,95 16:35  
SAMPLE TIME: MAY 4,95 16:27

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

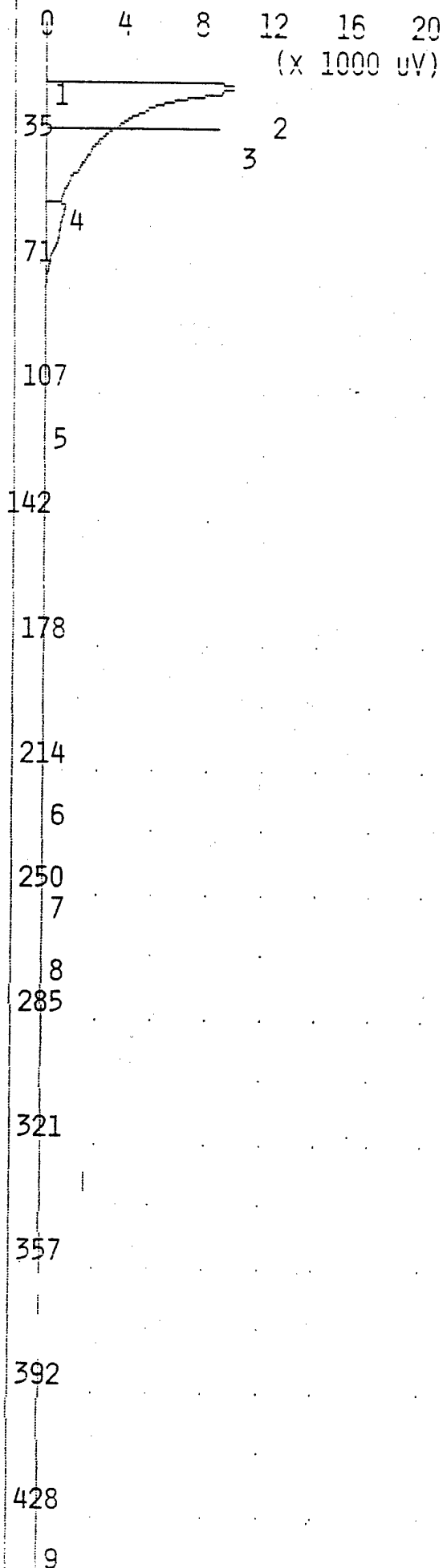
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.011 MVS	14.8
2	UNKNOWN	13.43 MVS	16.8
3	UNKNOWN	130.2 MVS	18.4
4	UNKNOWN	8.796 MVS	51.4
5	UNKNOWN	1.760 MVS	58.6
6	BENZENE	5.456 PPB	59.3
7	TOLUENE	2.228 PPB	118.2
8	UNKNOWN	2.715 MVS	140.6
9	UNKNOWN	3.136 MVS	160.8
10	UNKNOWN	1.860 MVS	213.6
11	ETHYLBENZENE	0.483 PPB	244.0
12	M,P-XYLENE	3.539 PPB	266.1
13	O-XYLENE	1.761 PPB	312.0

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-006BH  
11.0-11.5 10g

## ANALYSIS #22 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 16:47  
SAMPLE TIME: MAY 4,95 16:39

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.059 MVS	14.8
2	UNKNOWN	15.59 MVS	16.8
3	UNKNOWN	112.8 MVS	18.3
4	UNKNOWN	16.84 MVS	50.7
5	TOLUENE	1.598 PPB	119.0
6	UNKNOWN	1.160 MVS	220.0
7	ETHYLBENZENE	0.860 PPB	249.3
8	M,P-XYLENE	2.493 PPB	264.0
9	UNKNOWN	0.077 MVS	433.6

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-002BH  
0.5- 2.5 10G

## ANALYSIS #23 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8- 179 188 199

ESTIMATED TIME MAX 4.85 18:59

35 2  
71 3  
107  
4  
142  
178  
214  
5  
250  
285  
321  
357  
392  
428  
464

SLOPE UP 1.000 MV/SEC  
SLOPE DOWN 3.000 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	12.77 MVS	16.8
2	UNKNOWN	101.2 MVS	18.8
3	UNKNOWN	2.405 MVS	51.2
4	TOLUENE	1.414 PPB	119.0
5	UNKNOWN	1.087 MVS	219.0

## NOTES

JOE BYRD, JR.

DULUTH ANGB

026-002BH

5.0- 7.5 10g



## ANALYSIS #24 10S+ GC FUNCTION ANALYSIS REPORT

TIME PRINTED: MAY 4 '85 17:12

SAMPLE TIME: MAY 1985 17:12

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.071 MVS	14.8
2	UNKNOWN	11.67 MVS	16.8
3	UNKNOWN	44.68 MVS	18.5
4	UNKNOWN	29.68 MVS	24.1
5	UNKNOWN	55.88 MVS	28.6
6	UNKNOWN	7.417 MVS	50.9
7	BENZENE	89.53 PPB	59.3
8	TOLUENE	80.78 PPB	118.5
9	UNKNOWN	0.824 MVS	220.2
10	ETHYLBENZENE	80.83 PPB	245.3
11	M,P-XYLENE	158.9 PPB	264.2
12	O-XYLENE	72.85 PPB	312.5

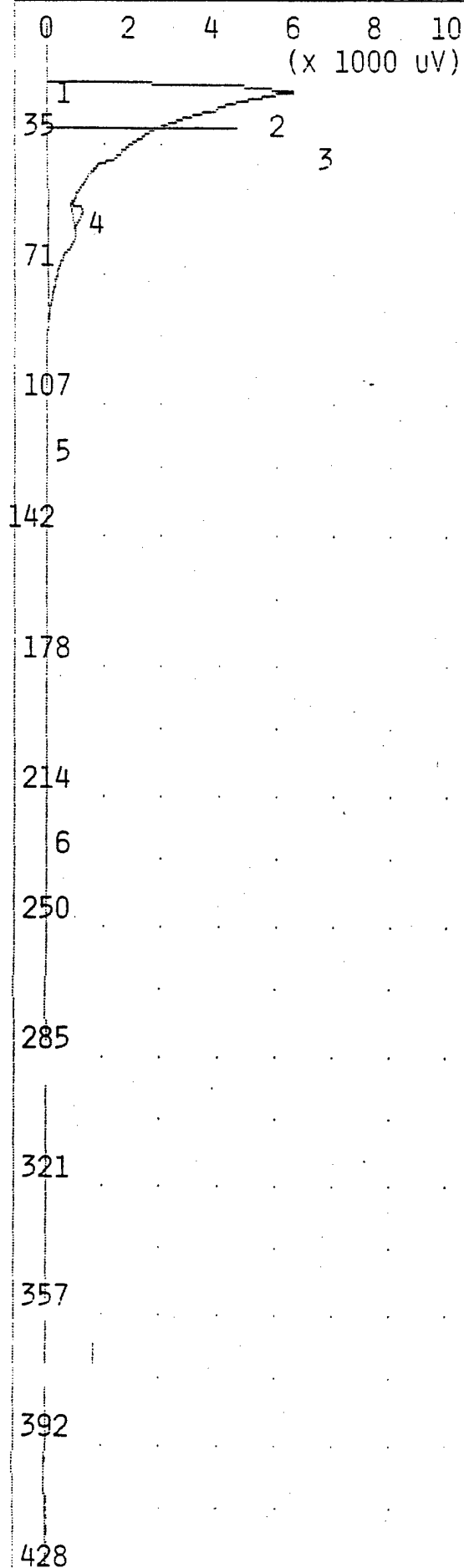
## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX



## ANALYSIS #25

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 17:27

SAMPLE TIME: MAY 4,95 17:19

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

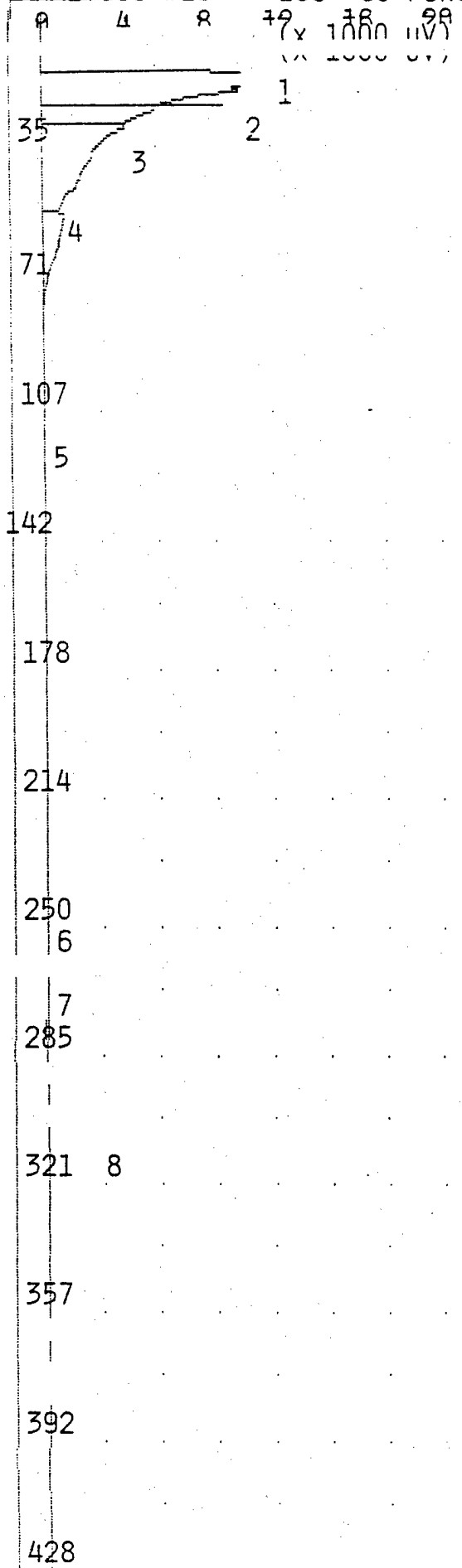
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.030 MVS	15.0
2	UNKNOWN	6.022 MVS	17.0
3	UNKNOWN	99.35 MVS	18.6
4	UNKNOWN	1.079 MVS	51.2
5	TOLUENE	0.353 PPB	118.5
6	ETHYLBENZENE	0.537 PPB	220.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

ANALYSIS #26 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTER: MAY 4 05 17:30  
 SAMPLE TIME: MAY 4 05 17:31  
 SAMPLE TIME: MAY 4 05 17:31

METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 500.0 SEC

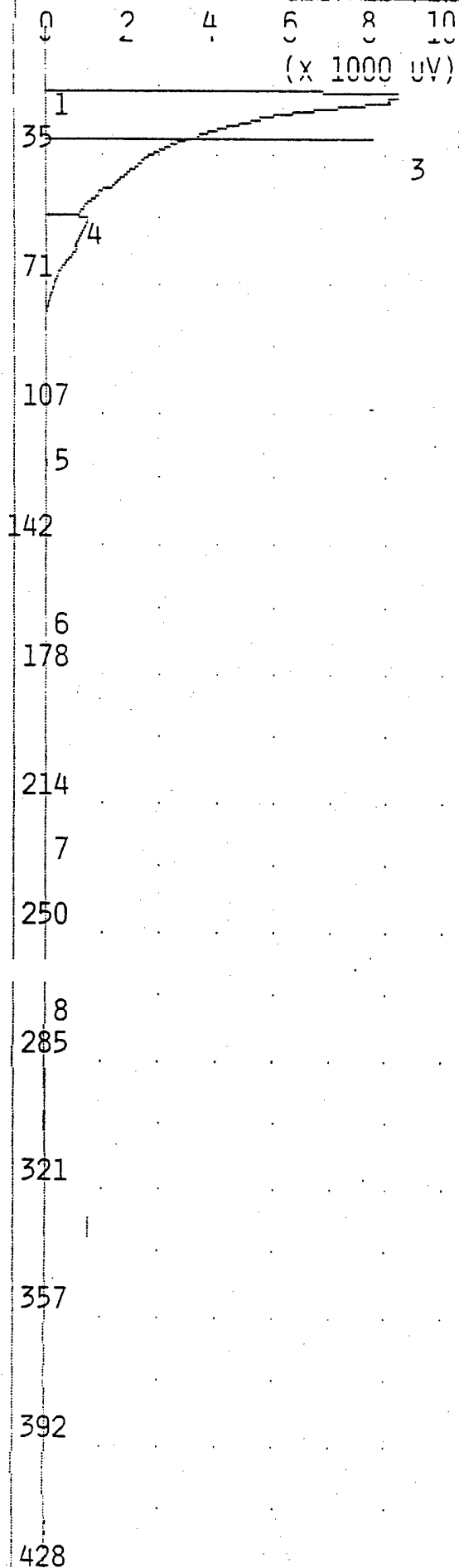
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	15.15 MVS	16.9
2	UNKNOWN	67.29 MVS	19.0
3	UNKNOWN	52.60 MVS	28.6
4	UNKNOWN	19.23 MVS	51.0
5	TOLUENE	1.779 PPB	118.2
6	ETHYLBENZENE	0.834 PPB	245.0
7	M,P-XYLENE	7.643 PPB	263.4
8	O-XYLENE	2.089 PPB	314.4

NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
~~AIR BLANK~~  
 026-003 BH  
 0.5'-2.5' 10g

## ANALYSIS #27 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4 95 17:51  
TIME PRINTED: MAY 4 95 17:51  
SAMPLE TIME: MAY 4 95 17:43

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

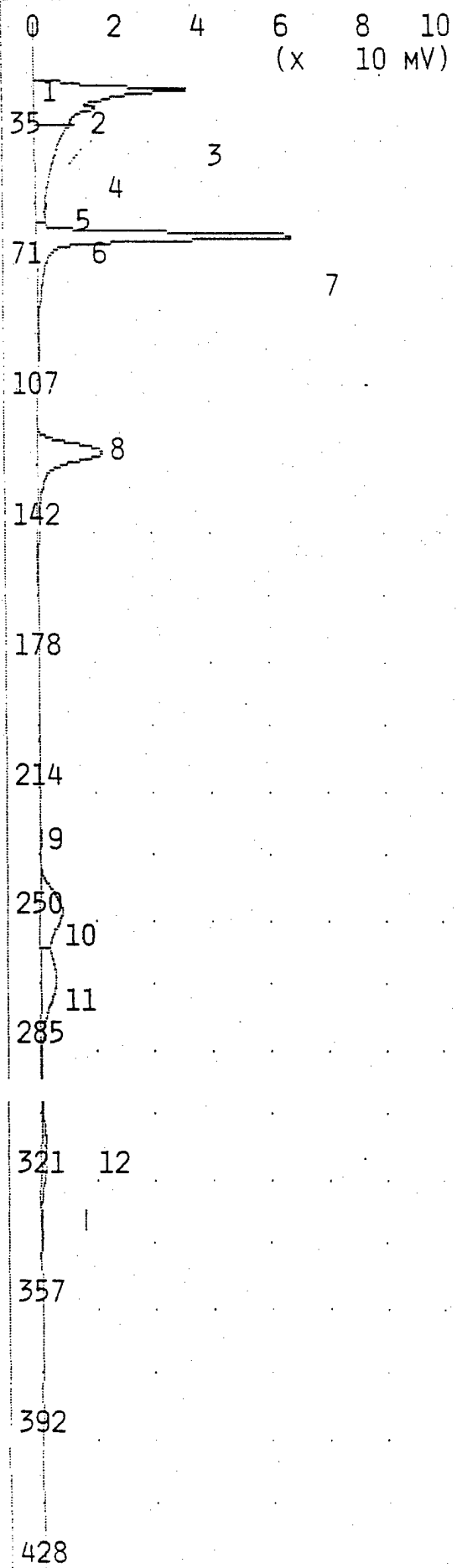
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.034 MVS	14.7
2	UNKNOWN	12.82 MVS	16.9
3	UNKNOWN	110.8 MVS	18.6
4	UNKNOWN	18.07 MVS	51.2
5	TOLUENE	1.596 PPB	118.4
6	UNKNOWN	0.583 MVS	157.0
7	UNKNOWN	0.432 MVS	218.0
8	M,P-XYLENE	3.998 PPB	266.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-003BH  
5.0-7.0 10G

ANALYSIS #28 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 4,95 18:04  
 SAMPLE TIME: MAY 4,95 17:56

METHOD

SLOPE UP 1.000 MV/SEC  
 SLOPE DOWN 3.000 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 500.0 SEC

PEAK REPORT

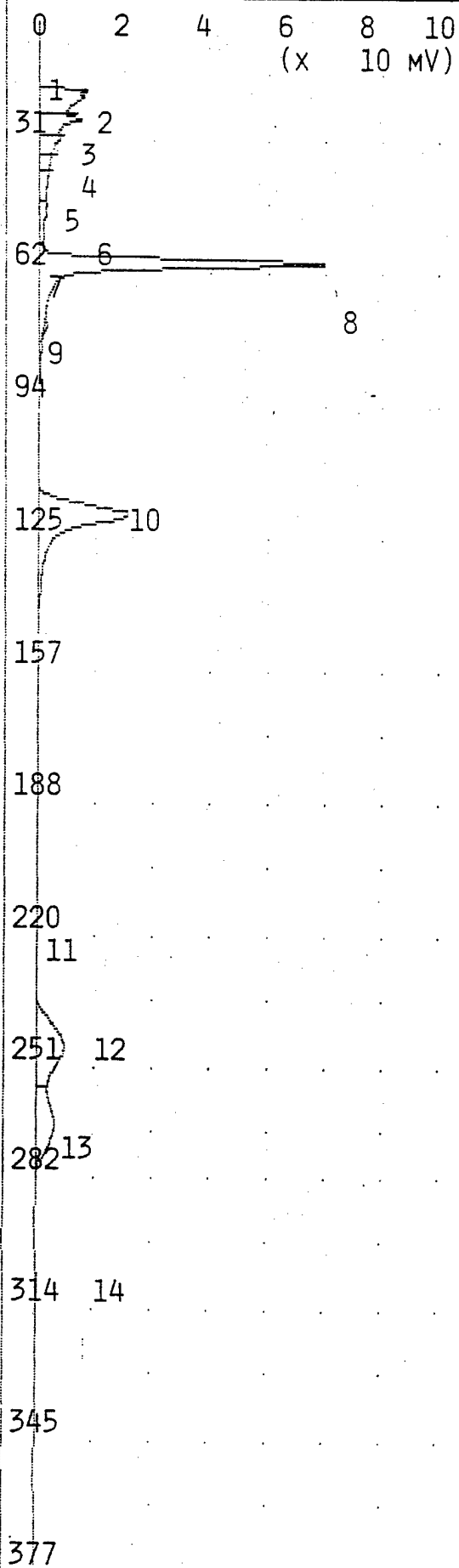
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.203 MVS	13.5
2	UNKNOWN	13.51 MVS	17.0
3	UNKNOWN	302.0 MVS	18.7
4	UNKNOWN	6.501 MVS	24.3
5	UNKNOWN	1.111 MVS	28.8
6	UNKNOWN	0.778 MVS	51.1
7	BENZENE	108.6 PPB	59.4
8	TOLUENE	96.42 PPB	118.5
9	UNKNOWN	1.804 MVS	218.8
10	ETHYLBENZENE	95.01 PPB	245.3
11	M,P-XYLENE	180.8 PPB	263.4
12	O-XYLENE	87.87 PPB	311.2

NOTES

DESTROY GREENWAY  
 DULUTH ANGB  
 100 PPB BTEX

## ANALYSIS #2

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 5,95 12:09

SAMPLE TIME: MAY 5,95 12:01

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

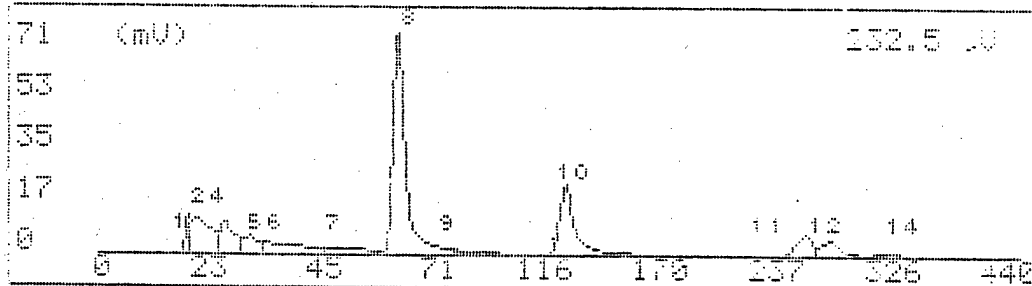
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.050 MVS	15.5
2	UNKNOWN	15.29 MVS	17.0
3	UNKNOWN	46.72 MVS	18.5
4	UNKNOWN	34.06 MVS	24.2
5	UNKNOWN	19.27 MVS	28.8
6	UNKNOWN	31.97 MVS	32.2
7	UNKNOWN	18.06 MVS	44.5
8	BENZENE	108.0 PPB	58.4
9	UNKNOWN	1.828 MVS	73.2
10	TOLUENE	89.07 PPB	117.8
11	UNKNOWN	1.712 MVS	218.2
12	ETHYLBENZENE	83.53 PPB	244.0
13	UNKNOWN	72.21 MVS	262.9
14	O-XYLENE	72.36 PPB	308.5

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

S.C. Ready		100+ GC Function		Ms	5.55	1.18
-- Analysis No 2		-- Run at		Ms	5.55	12:00
Pk No	Name	Conc/Area	Alert	Ret. Time		
6	Unknown	31.97 m/g	-N-	32.2	sec	
7	Unknown	18.06 m/g	-N-	34.0	sec	
8	benzene	100.0 p.p.m	-N-	30.3	sec	
9	Unknown	1.820 m/g	-N-	30.3	sec	
10	toluene	100.0 p.p.m	-N-	31.7	sec	
11	Unknown	1.712 m/g	-N-	31.8	sec	
12	ethylbenzene	100.0 p.p.m	-N-	34.9	sec	
13	m,p-xylene	200.0 p.p.m	-N-	32.0	sec	
14	o-xylene	100.0 p.p.m	-N-	30.8	sec	
- Detected 14 peaks. Use + + to scroll						[ 445 sec ]

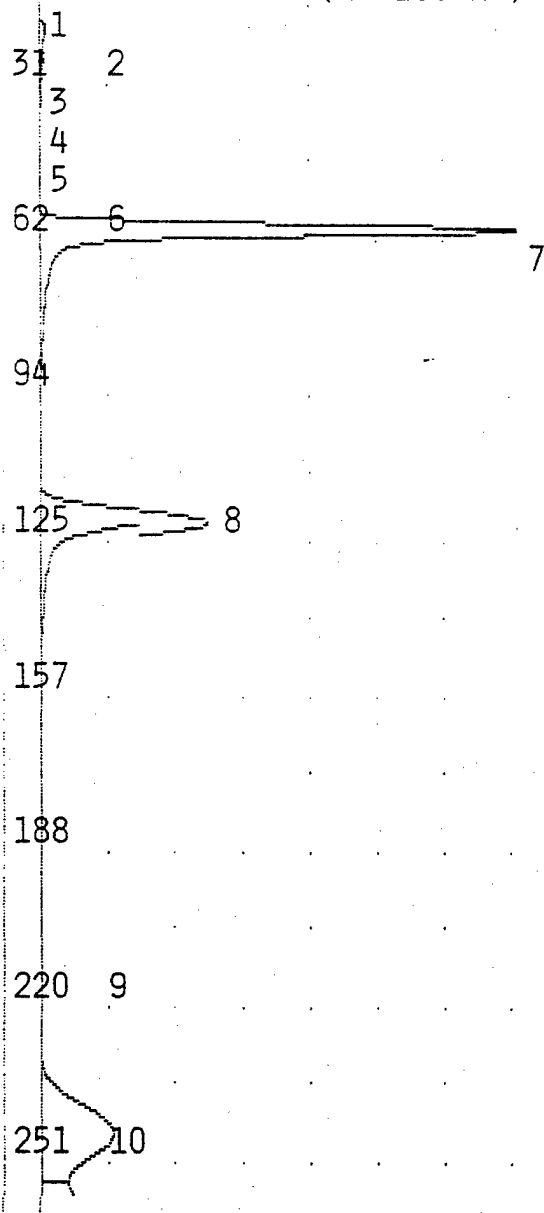




## ANALYSIS #3

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 100 mV)



TIME PRINTED: MAY 5,95 12:29  
SAMPLE TIME: MAY 5,95 12:22

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

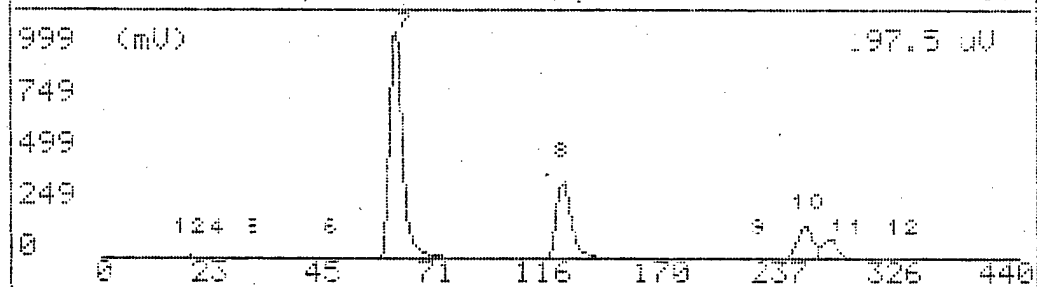
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.035 MVS	15.0
2	UNKNOWN	18.43 MVS	17.0
3	UNKNOWN	56.33 MVS	18.6
4	UNKNOWN	37.44 MVS	24.2
5	UNKNOWN	53.75 MVS	28.6
6	UNKNOWN	16.94 MVS	44.6
7	BENZENE	1.472 PPM	58.6
8	TOLUENE	1.635 PPM	117.3
9	UNKNOWN	0.590 MVS	211.0
10	ETHYLBENZENE	2.139 PPM	243.2
11	M,P-XYLENE	3.952 PPM	261.6
12	O-XYLENE	2.758 PPM	307.4

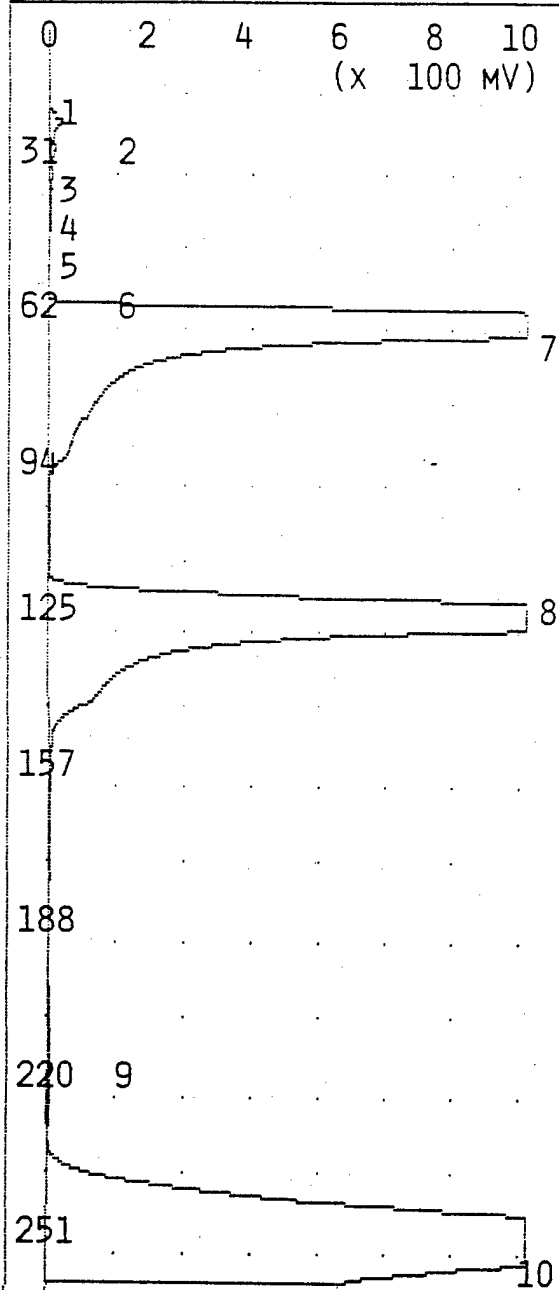
## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
1 PPM BTEX

S.C. Reedy		10S+ GC Function		May 5.95	11:13
-- Analysis No 0		-- Run at --		May 5.95	12:21
Pk no	Name	Conc/Area	Alarm	Ret. Time	
4	Unknown	37.44	mV	-No-	24.0 sec
5	Unknown	53.75	mV	-No-	28.6 sec
6	Unknown	16.94	mV	-No-	44.6 sec
7	benzene	1.000	ppm	-No-	56.6 sec
8	toluene	1.000	ppm	-No-	117.0 sec
9	Unknown	0.590	mV	-No-	211.0 sec
10	ethylbenzene	1.000	ppm	-No-	243.0 sec
11	m,p-xylene	1.000	ppm	-No-	261.0 sec
12	o-xylene	1.000	ppm	-No-	307.0 sec
- Detected 12 peaks. Use + + to scroll. [ 445 sec]					



ANALYSIS #4 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 5,95 12:45  
SAMPLE TIME: MAY 5,95 12:38

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

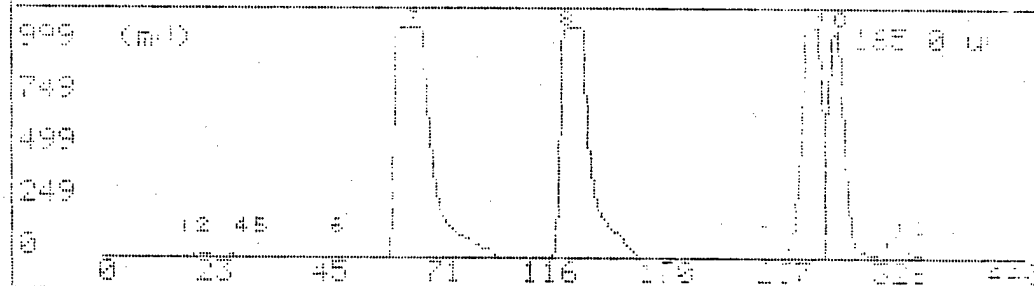
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.046 MVS	15.0
2	UNKNOWN	17.07 MVS	17.0
3	UNKNOWN	90.60 MVS	18.6
4	UNKNOWN	53.17 MVS	24.4
5	UNKNOWN	68.36 MVS	28.7
6	UNKNOWN	15.38 MVS	45.0
7	BENZENE	5.453 PPM	59.6
8	TOLUENE	8.451 PPM	119.2
9	UNKNOWN	6.588 MVS	211.0
10	ETHYLBENZENE	9.865 PPM	246.4
11	M,P-XYLENE	8.935 PPM	264.2
12	O-XYLENE	6.312 PPM	309.0

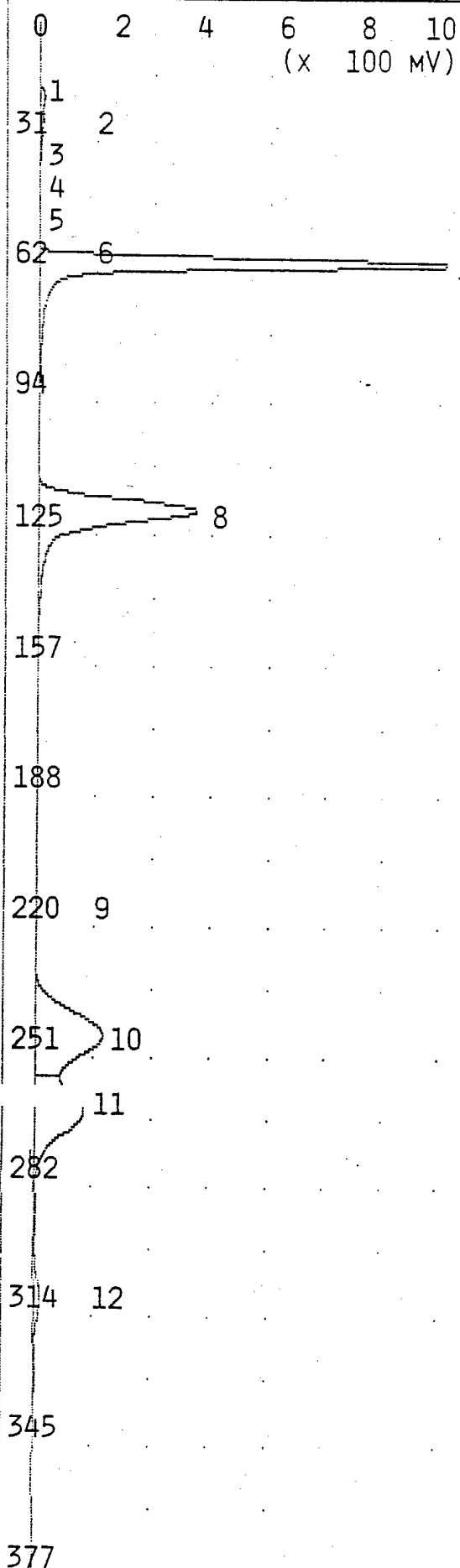
NOTES

JOE BYRD, JR.  
DULUTH ANGB  
10 PPM BTEX

G.C. Ready		185+ GC Function	40	4.95	12:11
Analysis No 4		Run at	40	4.95	12:11
Pk No	Name	Conc/Area			
4	Unknown	53.17 mUS	-	-	
5	Unknown	60.36 mUS	-	-	
6	Unknown	13.38 mUS	-	-	
7	benzene	10.00 ppm	-	-	
8	toluene	10.00 ppm	-	-	
9	Unknown	10.00 mUS	-	-	
10	ethylbenzene	10.00 ppm	-	-	
11	m-xylene	10.00 ppm	-	-	
12	o-xylene	10.00 ppm	-	-	
- Detected 12 Peaks. Use + + to zoom: 1					



ANALYSIS #5 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 5,95 13:10  
SAMPLE TIME: MAY 5,95 13:02

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

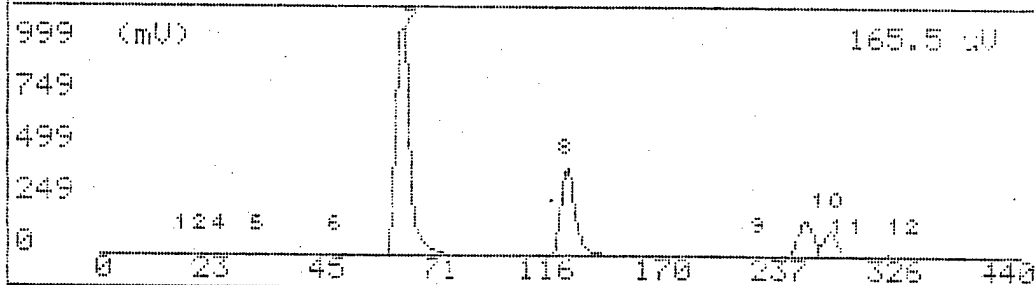
PEAK REPORT

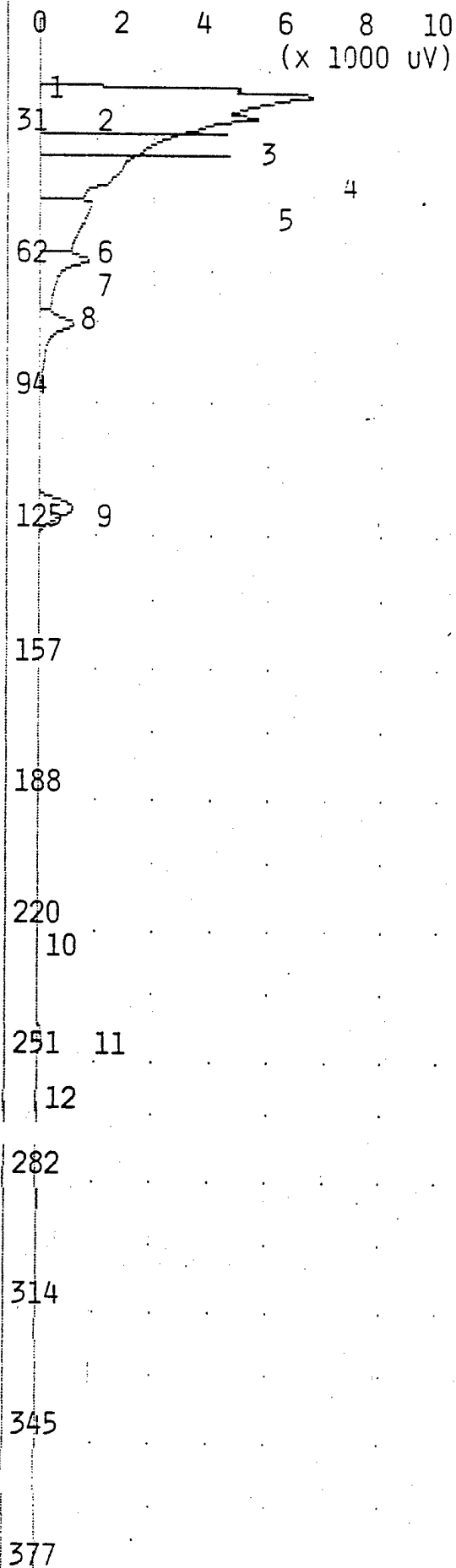
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.057 MVS	15.1
2	UNKNOWN	16.91 MVS	17.0
3	UNKNOWN	57.57 MVS	18.6
4	UNKNOWN	36.89 MVS	24.3
5	UNKNOWN	55.05 MVS	28.8
6	UNKNOWN	17.90 MVS	44.8
7	BENZENE	1.231 PPM	58.8
8	TOLUENE	1.111 PPM	117.8
9	UNKNOWN	0.829 MVS	210.6
10	ETHYLBENZENE	1.074 PPM	244.0
11	M,P-XYLENE	1.310 PPM	259.4
12	O-XYLENE	1.060 PPM	307.7

NOTES

JOE BYRD, JR.  
DULUTH ANGB  
1 PPM BTEX

G.C. Ready		108+ GC Function	Ms: E, 95	10:14
-- Analysis No 5		-- Run at --	May 8.95	13:01
Pk No	Name	Conc/Area	Alarm	Ret. Time
4	Unknown	36.89 mUS	-No-	34.3 sec
5	Unknown	35.85 mUS	-No-	36.0 sec
6	Unknown	17.96 mUS	-No-	44.0 sec
7	benzene	999.9 ppb	-No-	50.0 sec
8	toluene	1.000 ppm	-No-	71.0 sec
9	Unknown	0.829 mUS	-No-	216.0 sec
10	ethylbenzene	1.000 ppm	-No-	244.0 sec
11	m,p-xylene	2.000 ppm	-No-	259.4 sec
12	o-xylene	1.000 ppm	-No-	267.7 sec
- Detected 12 peaks. Use + + to scroll [ 445 sec]				





TIME PRINTED: MAY 5,95 13:24

SAMPLE TIME: MAY 5,95 13:17

## METHOD

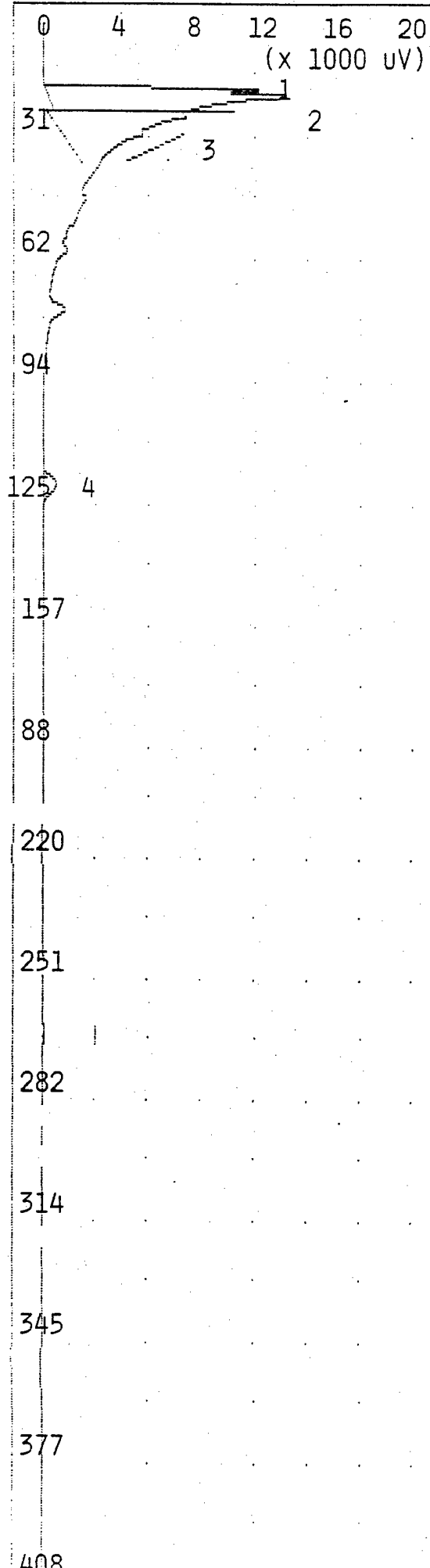
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.021 MVS	13.3
2	UNKNOWN	0.059 MVS	15.5
3	UNKNOWN	5.599 MVS	17.2
4	UNKNOWN	33.16 MVS	18.8
5	UNKNOWN	58.27 MVS	24.2
6	UNKNOWN	14.17 MVS	44.8
7	BENZENE	3.586 PPB	58.2
8	UNKNOWN	5.698 MVS	72.9
9	TOLUENE	4.090 PPB	116.9
10	UNKNOWN	0.604 MVS	219.2
11	ETHYLBENZENE	6.202 PPB	243.7
12	M,P-XYLENE	13.28 PPB	261.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK



TIME PRINTED: MAY 5,95 13:35

SAMPLE TIME: MAY 5,95 13:28

## METHOD

SLOPE UP 3.500 MV/SEC

SLOPE DOWN 10.50 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 12 ML/MIN

B/F FLOW 12 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 31 C

MAX GAIN 1000

ANALYSIS TIME 440.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	16.23 MVS	17.0
2	UNKNOWN	89.25 MVS	18.6
3	UNKNOWN	0.487 MVS	24.2
4	TOLUENE	3.253 PPB	118.6

## NOTES

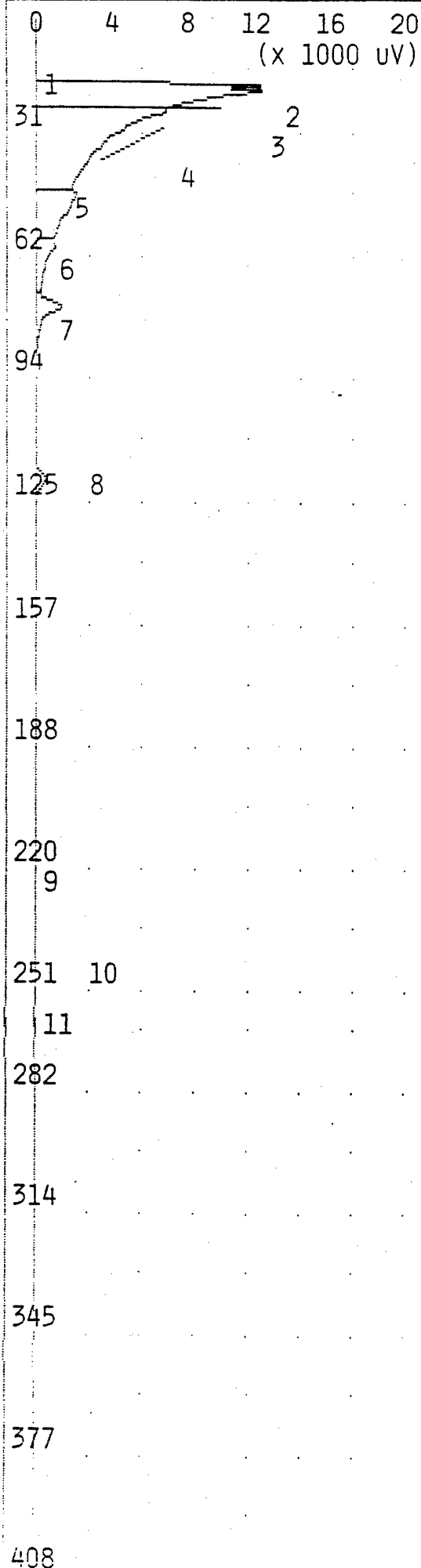
JOE BYRD, JR.

DULUTH ANGB

026-001MW

1.0- 2.0 10G





TIME PRINTED: MAY 5,95 13:46

SAMPLE TIME: MAY 5,95 13:39

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.071 MVS	14.5
2	UNKNOWN	16.13 MVS	17.0
3	UNKNOWN	131.0 MVS	18.6
4	UNKNOWN	0.543 MVS	24.0
5	UNKNOWN	21.36 MVS	44.9
6	BENZENE	3.592 PPB	58.2
7	UNKNOWN	8.024 MVS	73.6
8	TOLUENE	2.854 PPB	118.0
9	UNKNOWN	2.154 MVS	219.2
10	ETHYLBENZENE	3.111 PPB	245.6
11	M,P-XYLENE	5.708 PPB	261.0

## NOTES

JOE BYRD, JR.

DULUTH ANGB

026-001MW

5.0- 7.0 10G

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 5,95 13:57

SAMPLE TIME: MAY 5,95 13:50

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

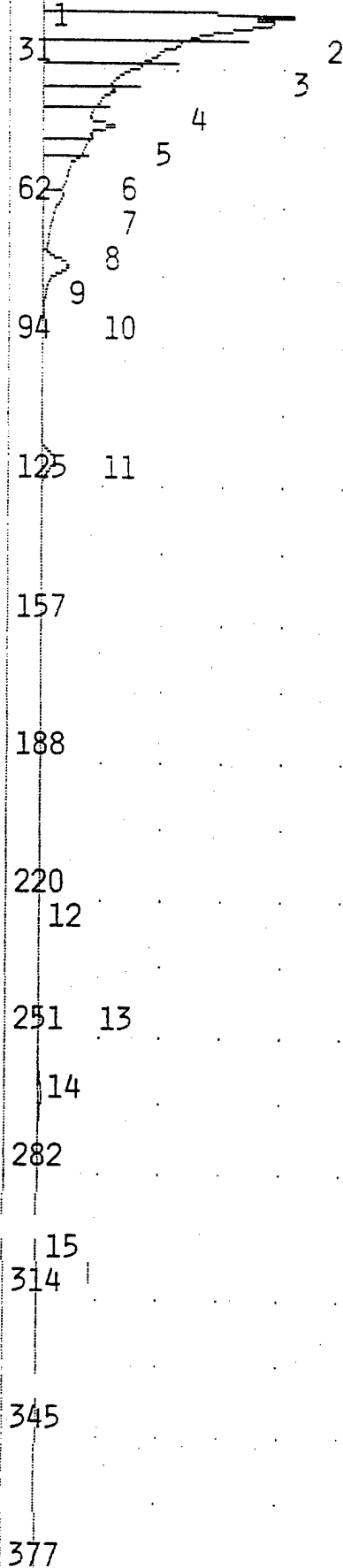
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.036 MVS	13.2
2	UNKNOWN	0.107 MVS	15.4
3	UNKNOWN	15.60 MVS	17.0
4	UNKNOWN	50.46 MVS	18.6
5	UNKNOWN	29.63 MVS	24.2
6	UNKNOWN	41.96 MVS	28.8
7	UNKNOWN	6.564 MVS	42.2
8	UNKNOWN	21.19 MVS	44.6
9	BENZENE	3.097 PPB	58.2
10	UNKNOWN	11.87 MVS	73.4
11	TOLUENE	2.977 PPB	117.3
12	UNKNOWN	2.619 MVS	213.0
13	ETHYLBENZENE	2.198 PPB	245.0
14	M,P-XYLENE	6.394 PPB	261.0
15	O-XYLENE	5.036 PPB	299.2

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-001MW  
10.0-12.0 10g

## ANALYSIS #10 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8 12 16 20  
(x 1000 UV)TIME PRINTED: MAY 5,95 14:08  
SAMPLE TIME: MAY 5,95 14:01

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

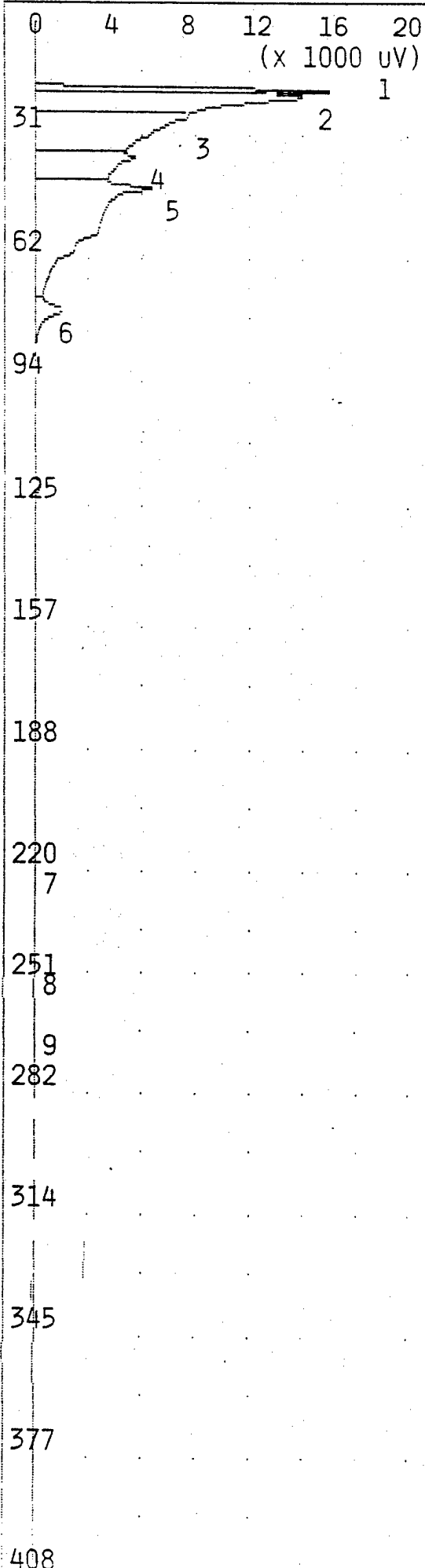
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.104 MVS	15.3
2	UNKNOWN	16.73 MVS	17.0
3	UNKNOWN	49.92 MVS	19.0
4	UNKNOWN	27.33 MVS	24.0
5	UNKNOWN	19.98 MVS	28.6
6	UNKNOWN	20.61 MVS	34.1
7	UNKNOWN	10.60 MVS	42.2
8	UNKNOWN	21.18 MVS	44.6
9	BENZENE	2.955 PPB	58.0
10	UNKNOWN	6.841 MVS	73.4
11	TOLUENE	3.365 PPB	117.7
12	UNKNOWN	2.170 MVS	219.4
13	ETHYLBENZENE	2.637 PPB	244.5
14	M,P-XYLENE	9.060 PPB	261.0
15	O-XYLENE	8.235 PPB	299.7

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-001MW  
12.5-14.5 10G

## ANALYSIS #11 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 5,95 14:19

SAMPLE TIME: MAY 5,95 14:12

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

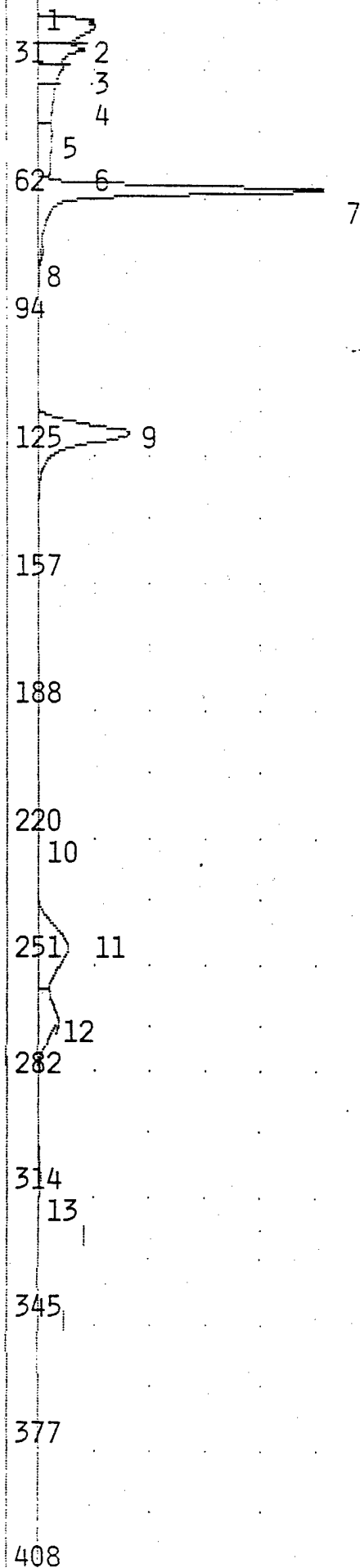
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	23.28 MVS	17.7
2	UNKNOWN	63.67 MVS	19.5
3	UNKNOWN	63.73 MVS	24.8
4	UNKNOWN	33.38 MVS	35.0
5	UNKNOWN	86.99 MVS	42.8
6	UNKNOWN	14.85 MVS	74.0
7	UNKNOWN	10.06 MVS	219.8
8	ETHYLBENZENE	5.634 PPB	246.9
9	M,P-XYLENE	12.66 PPB	265.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-001MW  
15.0-17.0 10G

## ANALYTeic #12 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 5,95 14:30

SAMPLE TIME: MAY 5,95 14:23

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.063 MVS	15.0
2	UNKNOWN	20.57 MVS	17.1
3	UNKNOWN	63.82 MVS	18.6
4	UNKNOWN	40.08 MVS	24.4
5	UNKNOWN	70.89 MVS	28.8
6	UNKNOWN	47.49 MVS	45.0
7	BENZENE	99.93 PPB	58.6
8	UNKNOWN	1.494 MVS	73.6
9	TOLUENE	95.88 PPB	118.1
10	UNKNOWN	7.576 MVS	219.4
11	ETHYLBENZENE	106.2 PPB	245.0
12	M,P-XYLENE	216.4 PPB	263.4
13	O-XYLENE	115.1 PPB	309.6

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

ANALYSIS #13 10S+ GC FUNCTION ANALYSIS REPORT

0 1 2 3 4 5  
(x 1000 UV)

TIME PRINTED: MAY 5,95 14:42

SAMPLE TIME: MAY 5,95 14:35

METHOD

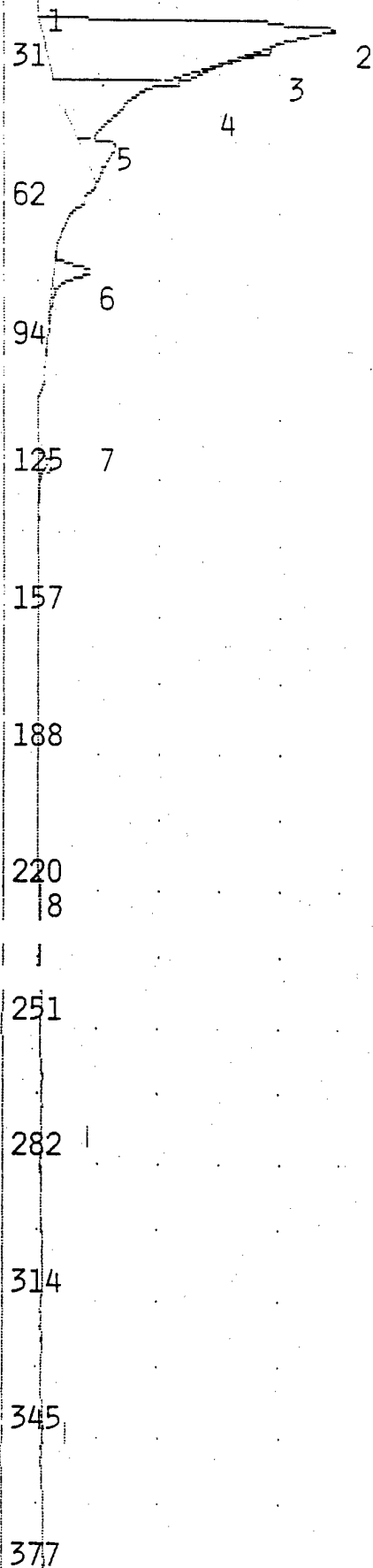
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

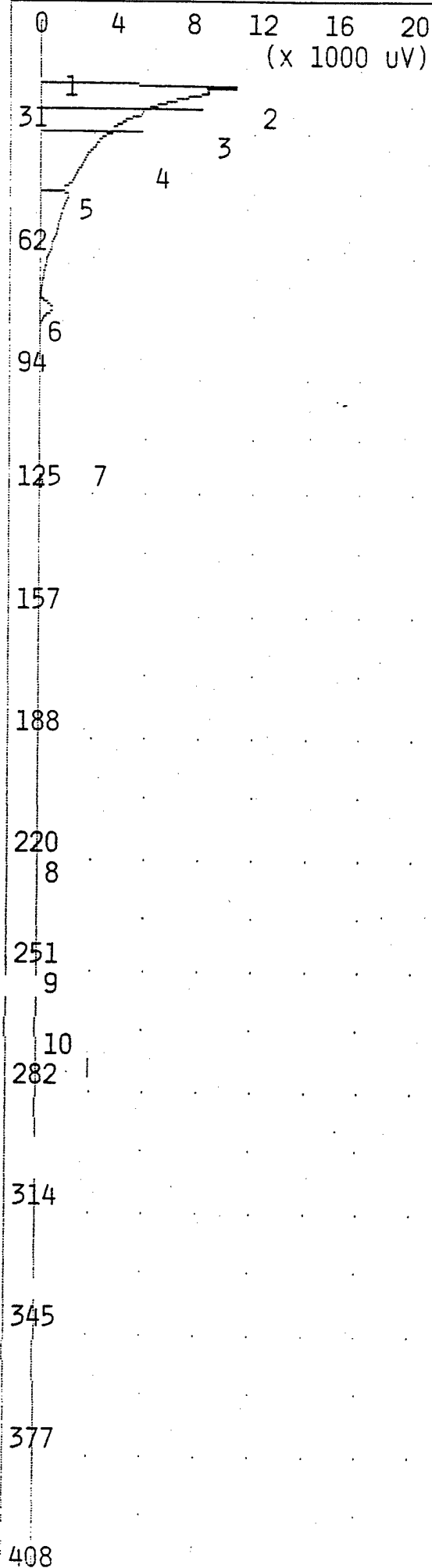
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.037 MVS	15.0
2	UNKNOWN	37.15 MVS	18.6
3	UNKNOWN	0.826 MVS	24.4
4	UNKNOWN	8.563 MVS	31.5
5	UNKNOWN	2.321 MVS	45.2
6	UNKNOWN	1.706 MVS	73.7
7	TOLUENE	0.729 PPB	118.5
8	UNKNOWN	0.451 MVS	218.6

NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK





TIME PRINTED: MAY 5,95 14:53

SAMPLE TIME: MAY 5,95 14:45

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 440.0 SEC

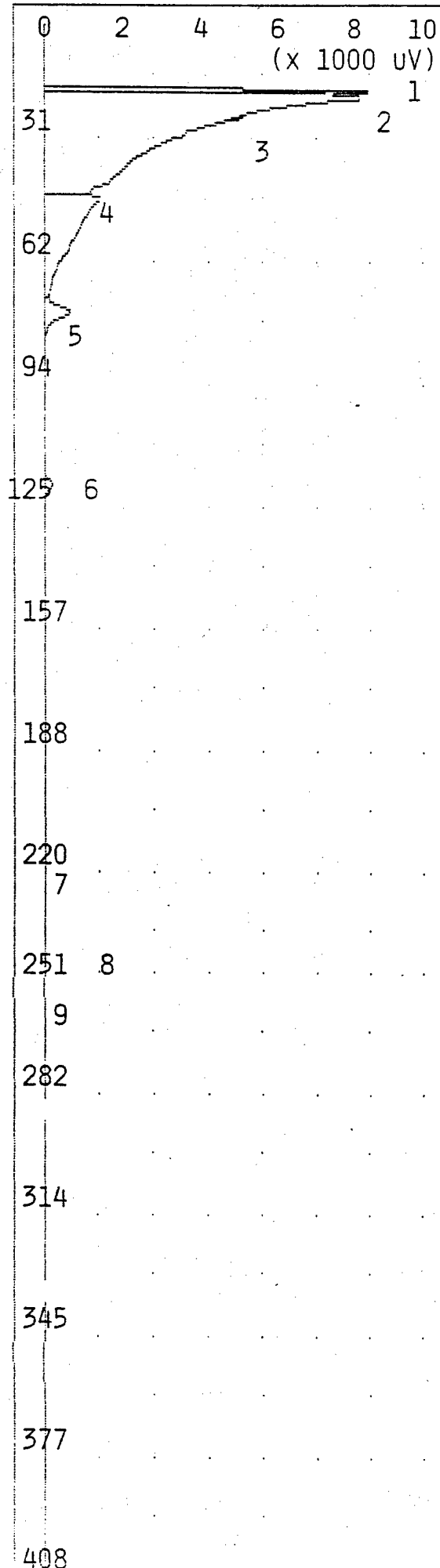
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.127 MVS	15.4
2	UNKNOWN	14.43 MVS	17.0
3	UNKNOWN	42.18 MVS	18.6
4	UNKNOWN	62.32 MVS	24.2
5	UNKNOWN	23.02 MVS	45.2
6	UNKNOWN	4.527 MVS	73.8
7	TOLUENE	2.123 PPB	118.4
8	UNKNOWN	1.504 MVS	218.6
9	ETHYLBENZENE	1.180 PPB	248.8
10	M,P-XYLENE	3.769 PPB	264.5

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 026-001MW  
 20.0-22.0 10G

## ANALYSIS #15 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 5,95 15:04

SAMPLE TIME: MAY 5,95 14:56

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 12 ML/MIN

B/F FLOW 12 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 31 C

MAX GAIN 1000

ANALYSIS TIME 440.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	11.79 MVS	17.0
2	UNKNOWN	99.93 MVS	19.0
3	UNKNOWN	0.232 MVS	24.0
4	UNKNOWN	21.68 MVS	45.0
5	UNKNOWN	4.262 MVS	73.7
6	TOLUENE	1.845 PPB	118.5
7	UNKNOWN	1.310 MVS	218.6
8	ETHYLBENZENE	0.787 PPB	243.7
9	M,P-XYLENE	2.676 PPB	261.6

## NOTES

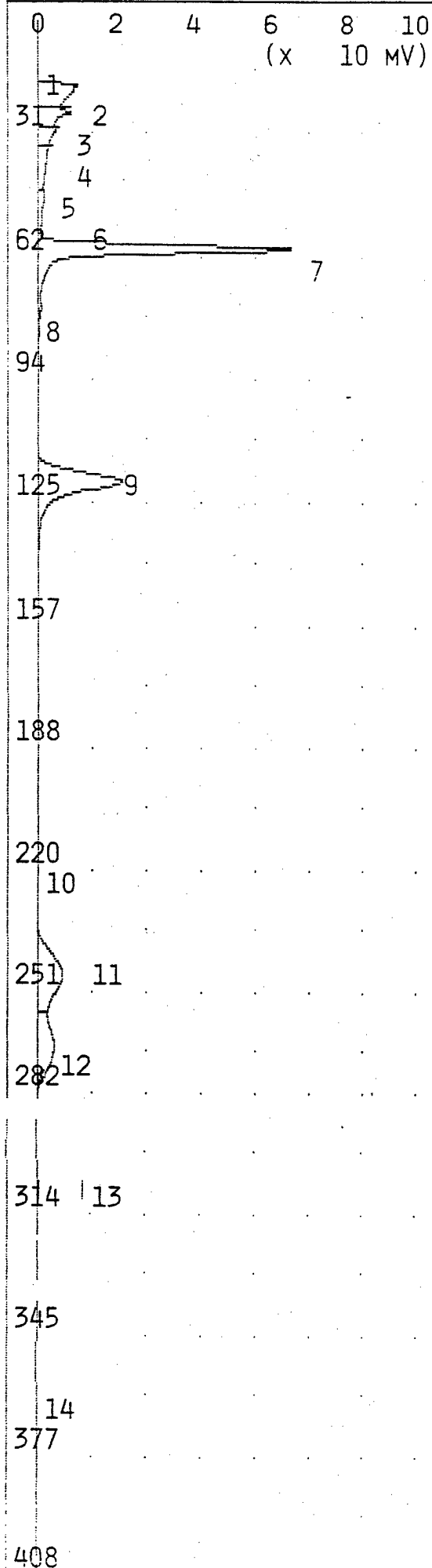
JOE BYRD, JR.

DULUTH ANGB

026-001MW

24.0-26.0 10G





TIME PRINTED: MAY 5,95 15:43

SAMPLE TIME: MAY 5,95 15:36

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 440.0 SEC

## PEAK REPORT

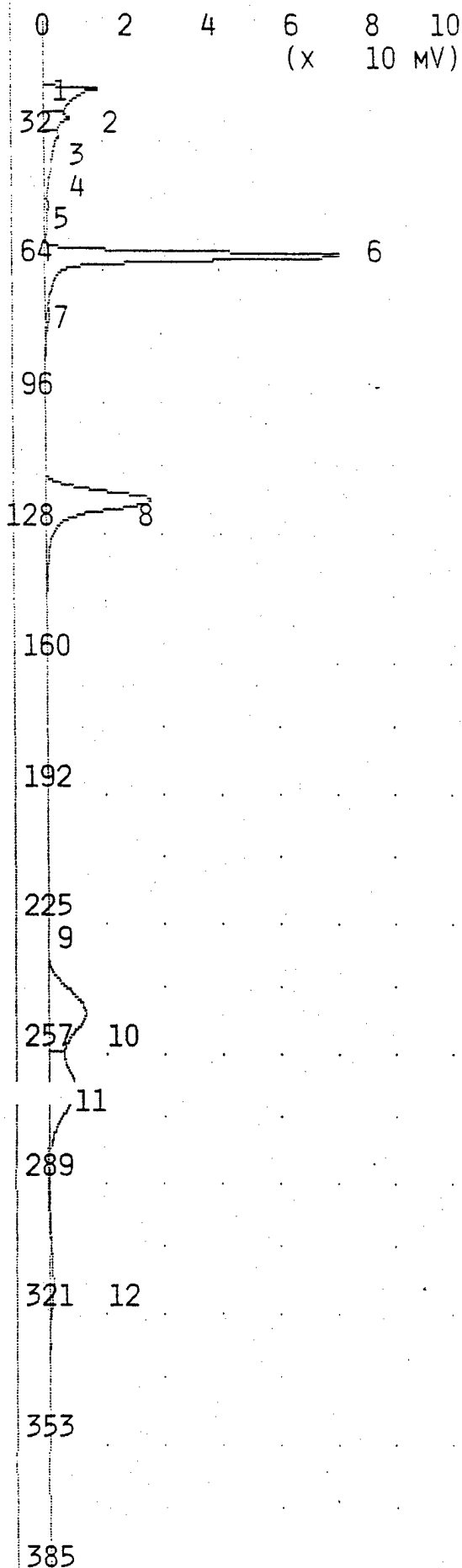
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.050 MVS	15.4
2	UNKNOWN	14.91 MVS	17.0
3	UNKNOWN	41.23 MVS	18.5
4	UNKNOWN	29.35 MVS	24.3
5	UNKNOWN	46.76 MVS	28.8
6	UNKNOWN	16.81 MVS	44.6
7	BENZENE	84.43 PPB	58.6
8	UNKNOWN	1.497 MVS	73.7
9	TOLUENE	90.34 PPB	118.0
10	UNKNOWN	11.32 MVS	218.8
11	ETHYLBENZENE	101.7 PPB	245.0
12	M,P-XYLENE	214.6 PPB	263.2
13	O-XYLENE	174.3 PPB	308.8
14	UNKNOWN	6.110 MVS	356.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

## ANALYSIS #1

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 6,95 14:12

SAMPLE TIME: MAY 6,95 14:04

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

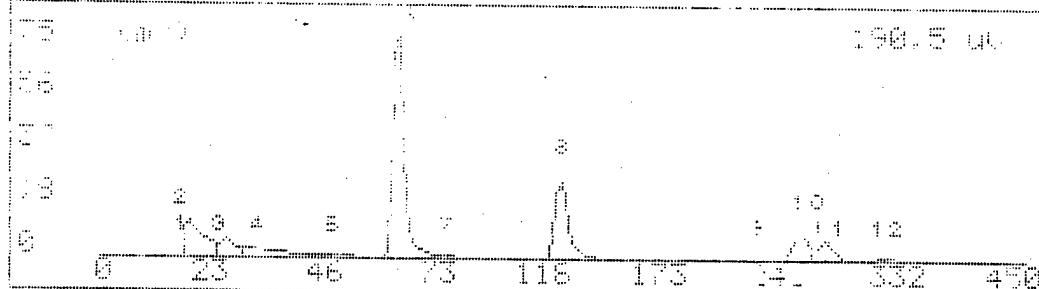
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.052 MVS	15.2
2	UNKNOWN	54.75 MVS	17.0
3	UNKNOWN	22.54 MVS	24.2
4	UNKNOWN	36.42 MVS	28.9
5	UNKNOWN	9.592 MVS	46.1
6	UNKNOWN	220.1 MVS	58.7
7	UNKNOWN	1.278 MVS	73.8
8	UNKNOWN	171.3 MVS	118.1
9	UNKNOWN	0.605 MVS	222.0
10	UNKNOWN	123.0 MVS	244.8
11	UNKNOWN	97.45 MVS	263.2
12	UNKNOWN	18.42 MVS	308.8

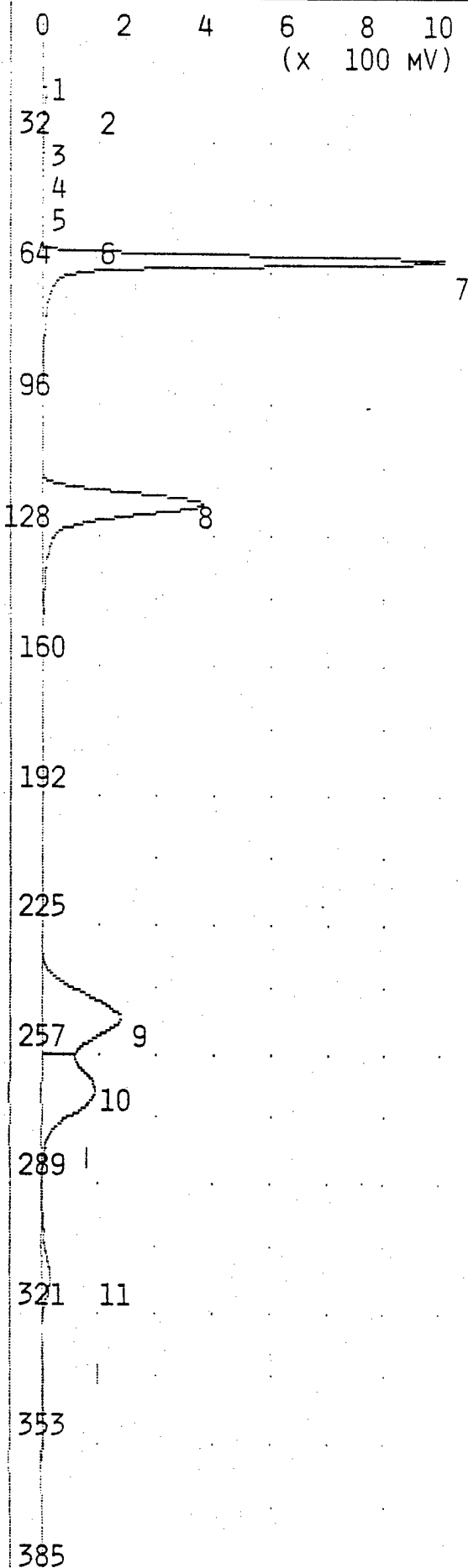
## NOTES

Joe Byrd, JR  
Duluth AUGB  
100 PPB BTX

E.C. Ready		108+ GC Function		1.95	14:38
Analysis No 1		Run at - Mar		1.95	14:04
PU No	Name	Conc/Area	Unit	Ret. Time	
4	Unknown	36.42	µUS	20.9	sec
5	Unknown	0.592	µUS	25.1	sec
6	benzene	100.0	ppb	30.1	sec
7	Unknown	1.278	µUS	33.6	sec
8	toluene	100.0	ppb	41.1	sec
9	Unknown	0.605	µUS	42.9	sec
10	ethylbenzene	100.0	ppb	44.3	sec
11	m,p-xylene	200.0	ppb	46.2	sec
12	o-xylene	100.0	ppb	48.0	sec
- Detected 12 peaks; Use + + to scan					48.0 sec



ANALYSIS #2 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 6,95 14:29  
SAMPLE TIME: MAY 6,95 14:22

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

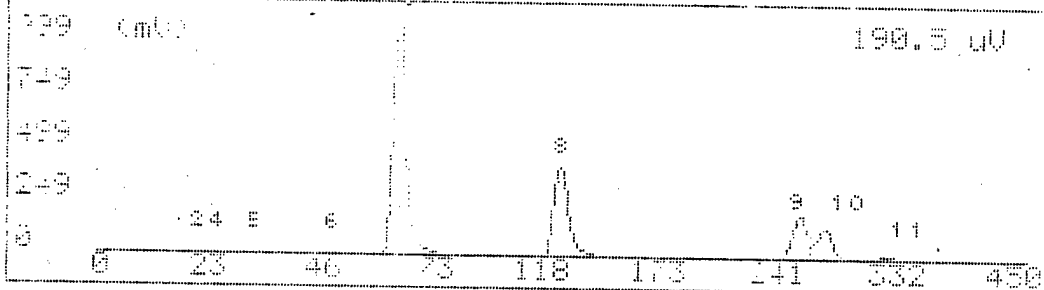
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.056 MVS	15.4
2	UNKNOWN	16.47 MVS	17.0
3	UNKNOWN	48.43 MVS	18.6
4	UNKNOWN	30.64 MVS	24.4
5	UNKNOWN	41.80 MVS	28.8
6	UNKNOWN	7.712 MVS	45.8
7	BENZENE	1.712 PPM	59.2
8	TOLUENE	1.721 PPM	118.6
9	ETHYLBENZENE	2.143 PPM	245.6
10	M,P-XYLENE	3.989 PPM	264.0
11	O-XYLENE	2.266 PPM	309.6

NOTES

JOE BYRD, JR.  
DULUTH ANGB  
1 PPM BTEX

B.C. Ready		1st GD Function		Se	5:55	14:39
-- Analysis No 2		-- Run at -		Ma	1:35	14:22
PK No	Name	Conc	Area	Alarm	Ret. Time	
1	Unknown	46.44	UVS	-No-	10.6	sec
2	Unknown	13.64	UVS	-No-	26.4	sec
3	Unknown	41.84	UVS	-No-	20.3	sec
4	Unknown	7.752	UVS	-No-	45.0	sec
5	Benzene	1.000	ppm	-No-	50.2	sec
6	Toluene	1.000	ppm	-No-	100.0	sec
7	ethylbenzene	1.000	ppm	-No-	140.0	sec
8	m-xylene	2.000	ppm	-No-	204.0	sec
9	o-xylene	1.000	ppm	-No-	209.0	sec
Detected 11 peaks. Use + + to scroll. [ 455 sec]						



ANALYSIS #3

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 100 MV)

TIME PRINTED: MAY 6,95 14:48

SAMPLE TIME: MAY 6,95 14:41

## METHOD

SLOPE UP 4.000 MV/SEC

SLOPE DOWN 12.00 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 12 ML/MIN

B/F FLOW 12 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 31 C

MAX GAIN 1000

ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	88.35 MVS	18.7
2	UNKNOWN	31.64 MVS	24.4
3	UNKNOWN	18.93 MVS	28.9
4	BENZENE	4.293 PPM	60.0
5	TOLUENE	6.586 PPM	119.3
6	UNKNOWN	5.591 MVS	212.6
7	ETHYLBENZENE	7.985 PPM	246.1
8	M,P-XYLENE	15.28 PPM	263.7
9	O-XYLENE	5.526 PPM	308.8

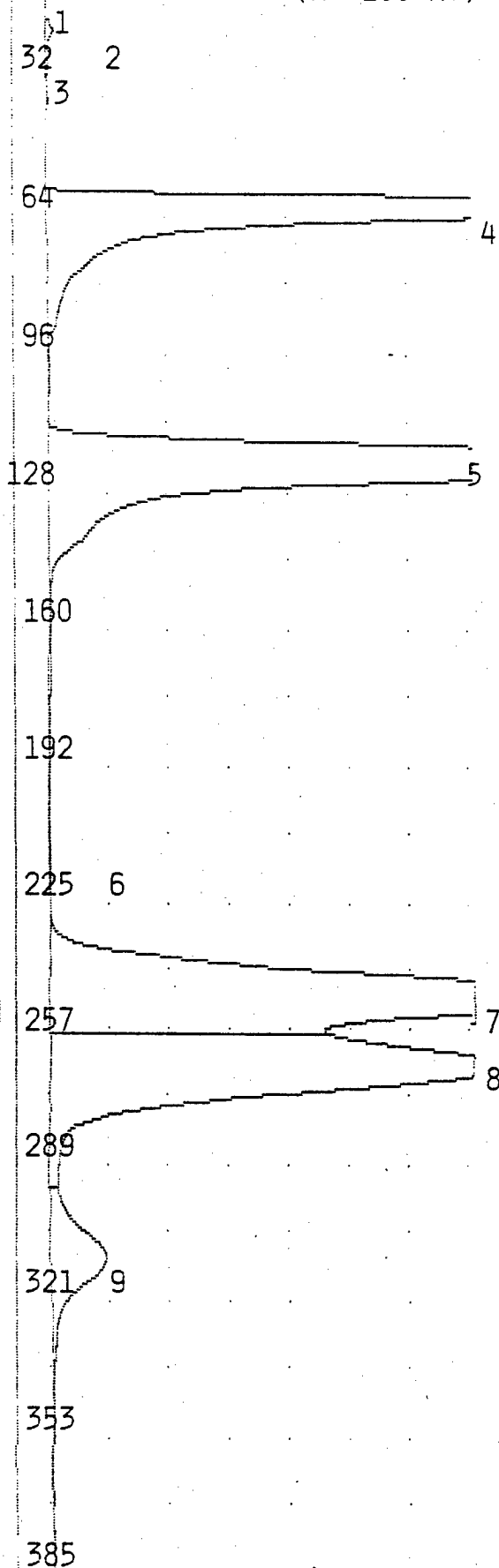
## NOTES

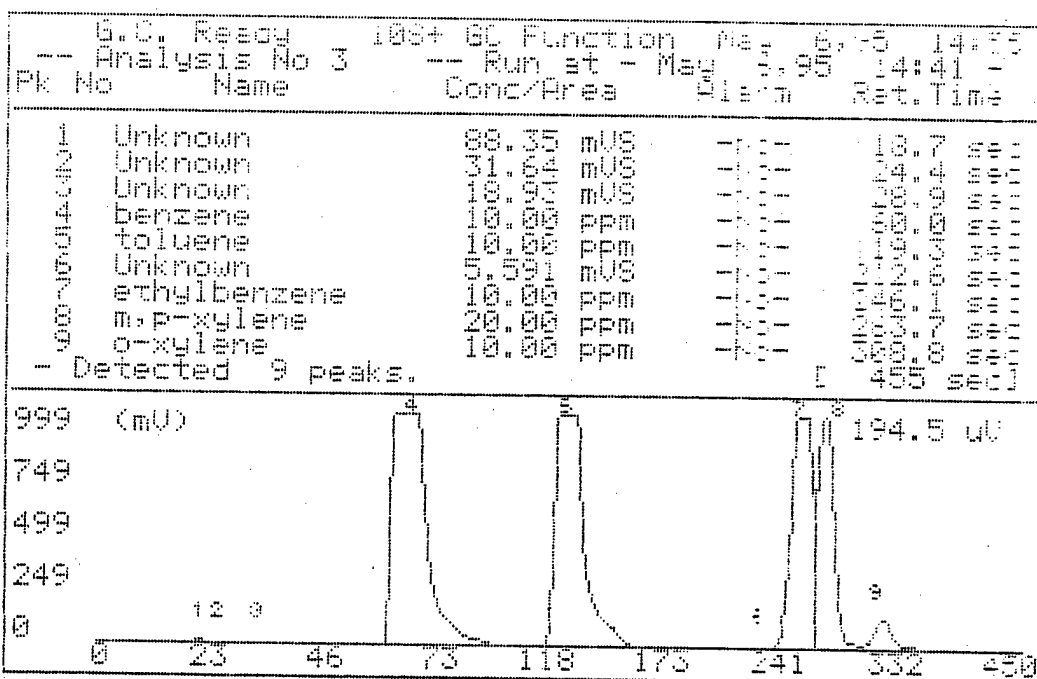
JOE BYRD, JR.

DULUTH ANGB

10 PPM BTEX

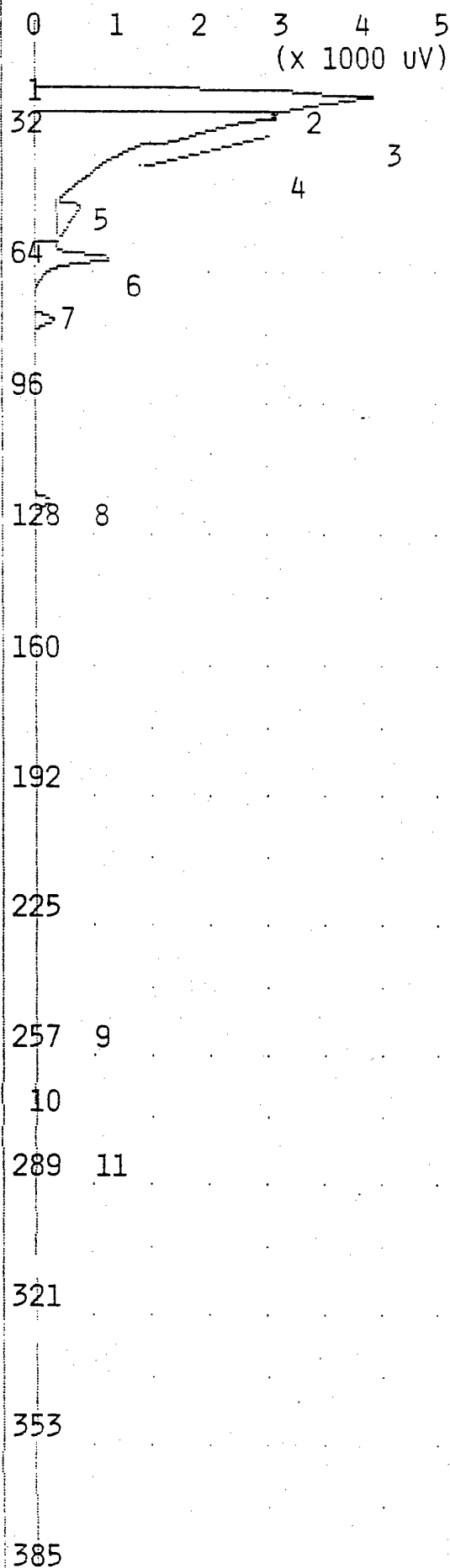
33





## ANALYSIS #4

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 6,95 15:04

SAMPLE TIME: MAY 6,95 14:56

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

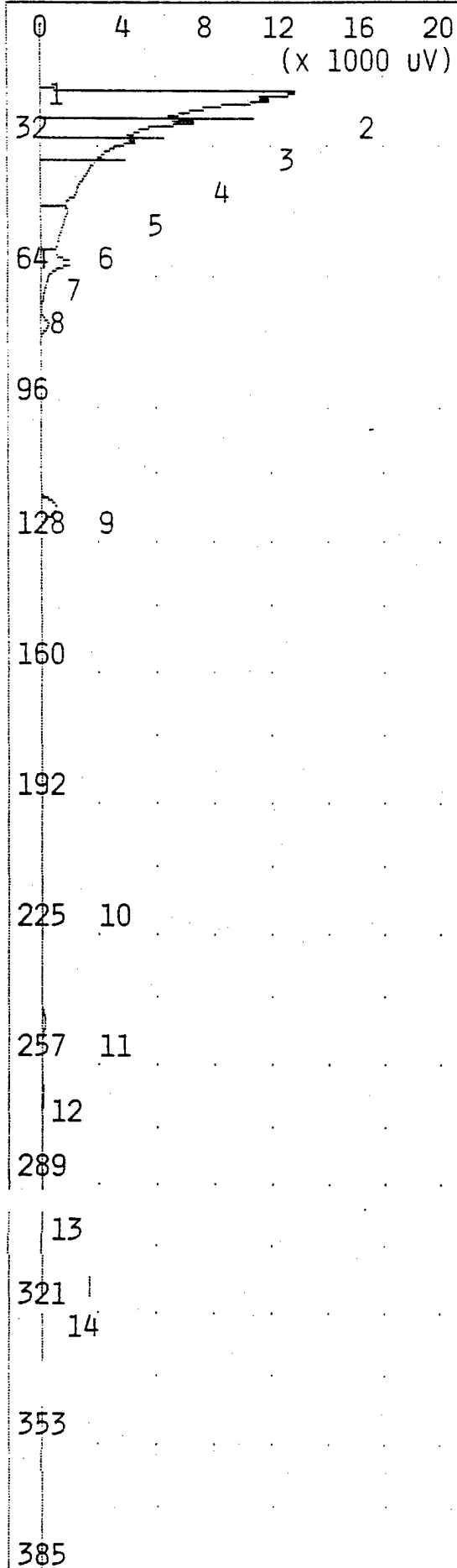
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.035 MVS	15.0
2	UNKNOWN	3.828 MVS	17.4
3	UNKNOWN	61.37 MVS	13.9
4	UNKNOWN	0.887 MVS	24.2
5	UNKNOWN	1.597 MVS	46.9
6	BENZENE	4.051 PPB	59.0
7	UNKNOWN	4.909 MVS	74.1
8	TOLUENE	2.628 PPB	118.2
9	ETHYLBENZENE	8.036 PPB	244.8
10	M,P-XYLENE	20.56 PPB	262.4
11	UNKNOWN	2.611 MVS	276.5

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK





TIME PRINTED: MAY 6,95 15:15

SAMPLE TIME: MAY 6,95 15:07

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 450.0 SEC

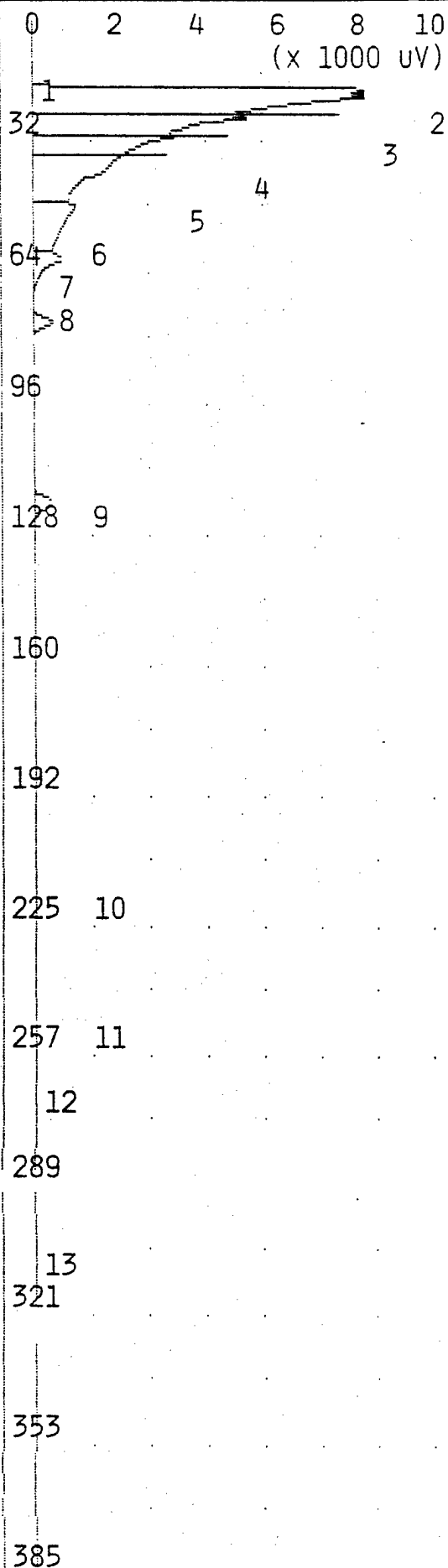
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.039 MVS	15.2
2	UNKNOWN	19.40 MVS	17.2
3	UNKNOWN	47.14 MVS	19.0
4	UNKNOWN	27.92 MVS	24.4
5	UNKNOWN	46.99 MVS	29.0
6	UNKNOWN	14.15 MVS	46.0
7	BENZENE	5.185 PPB	58.7
8	UNKNOWN	5.073 MVS	73.8
9	TOLUENE	4.483 PPB	118.4
10	UNKNOWN	0.857 MVS	217.6
11	ETHYLBENZENE	5.565 PPB	244.8
12	M,P-XYLENE	25.66 PPB	263.2
13	O-XYLENE	4.846 PPB	298.6
14	UNKNOWN	0.793 MVS	320.0

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 026-003MW  
 0.5- 2.5 10g

ANALYSIS #6 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 6,95 15:26

SAMPLE TIME: MAY 6,95 15:18

METHOD

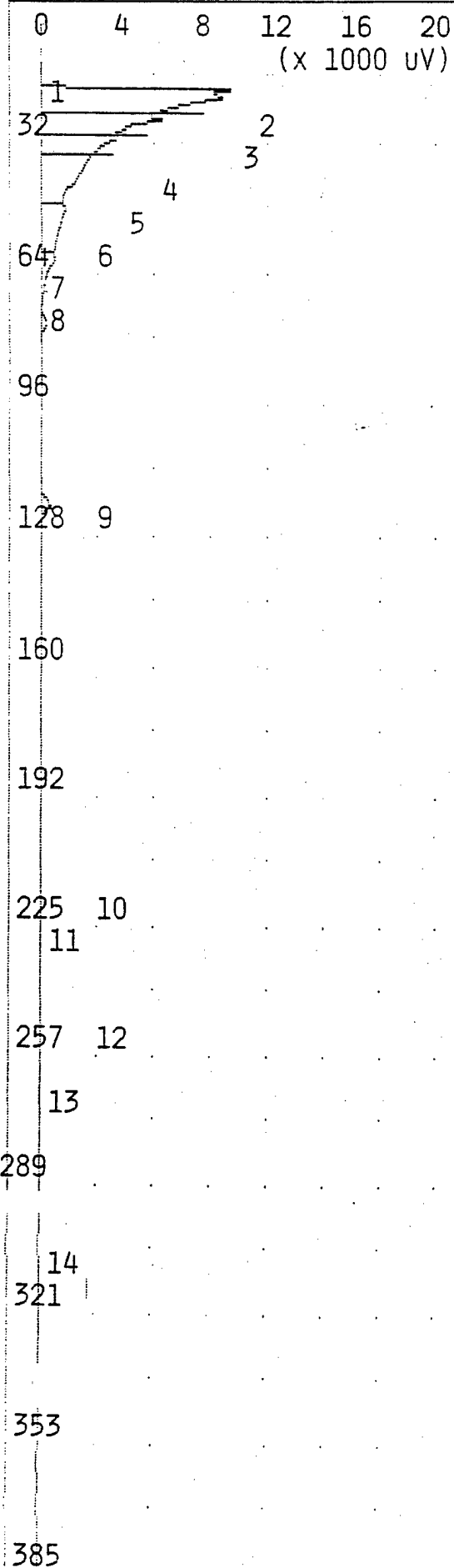
SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 32 C  
 MAX GAIN 1000  
 ANALYSIS TIME 450.0 SEC

PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.062 MVS	15.1
2	UNKNOWN	12.69 MVS	17.2
3	UNKNOWN	37.68 MVS	18.8
4	UNKNOWN	21.67 MVS	24.3
5	UNKNOWN	36.54 MVS	28.8
6	UNKNOWN	12.38 MVS	45.8
7	BENZENE	3.038 PPB	58.7
8	UNKNOWN	4.963 MVS	73.8
9	TOLUENE	3.301 PPB	118.9
10	UNKNOWN	62.07 MVS	214.8
11	ETHYLBENZENE	10.46 PPB	246.4
12	M,P-XYLENE	24.58 PPB	264.2
13	O-XYLENE	26.56 PPB	307.2

NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 026-003MW  
 5.0- 7.0 10g



TIME PRINTED: MAY 6,95 15:37

SAMPLE TIME: MAY 6,95 15:29

## METHOD

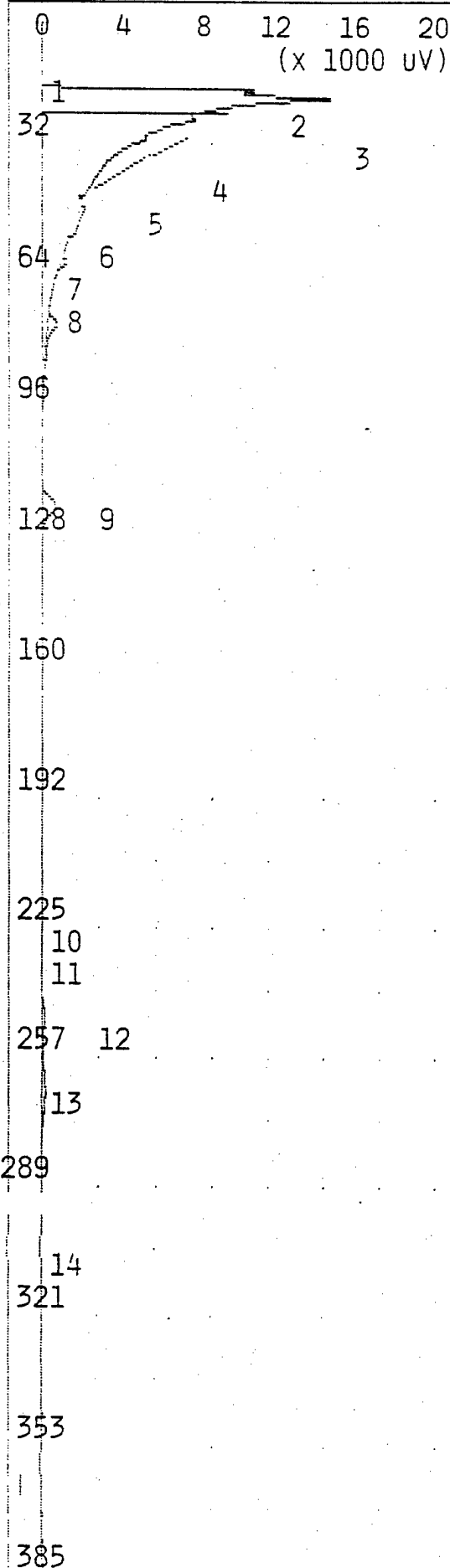
SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 32 C  
 MAX GAIN 1000  
 ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.044 MVS	15.0
2	UNKNOWN	13.20 MVS	17.0
3	UNKNOWN	41.40 MVS	18.8
4	UNKNOWN	23.35 MVS	24.3
5	UNKNOWN	39.98 MVS	28.8
6	UNKNOWN	13.45 MVS	45.8
7	BENZENE	2.672 PPB	58.8
8	UNKNOWN	2.669 MVS	73.8
9	TOLUENE	2.630 PPB	119.2
10	UNKNOWN	7.318 MVS	218.0
11	UNKNOWN	9.277 MVS	227.0
12	ETHYLBENZENE	10.93 PPB	245.3
13	M,P-XYLENE	31.80 PPB	265.3
14	O-XYLENE	28.49 PPB	305.6

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 026-003MW  
 10.0-12.0 10G



TIME PRINTED: MAY 6,95 15:48

SAMPLE TIME: MAY 6,95 15:40

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

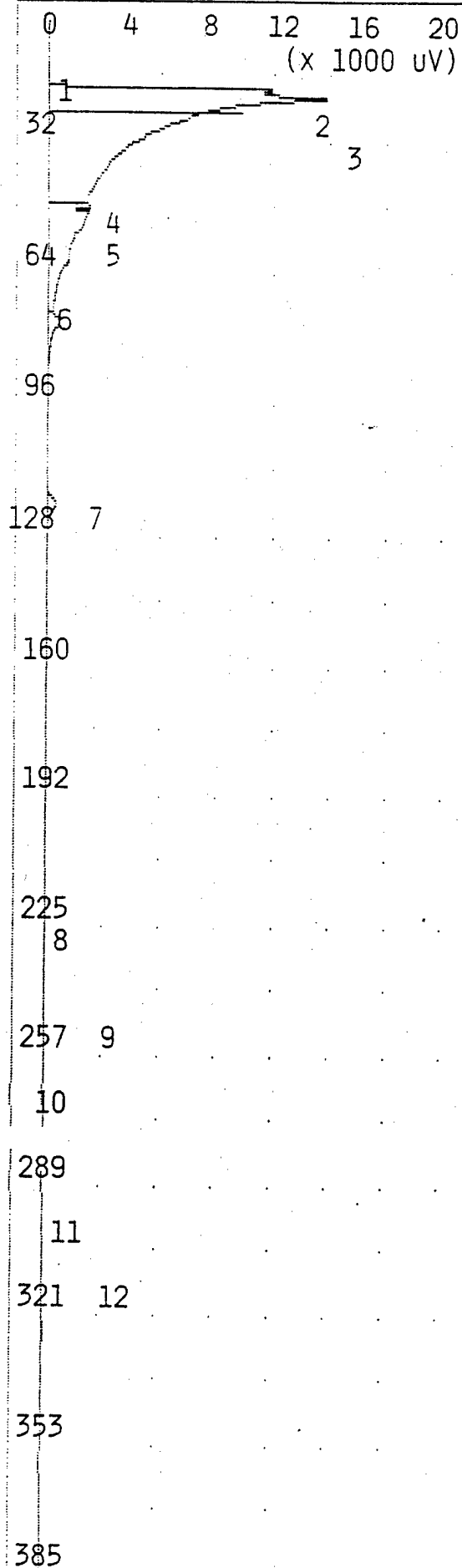
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.073 MVS	15.4
2	UNKNOWN	14.66 MVS	17.1
3	UNKNOWN	179.2 MVS	18.8
4	UNKNOWN	1.237 MVS	24.4
5	UNKNOWN	0.375 MVS	28.9
6	UNKNOWN	1.424 MVS	45.8
7	BENZENE	0.219 PPB	58.8
8	UNKNOWN	1.723 MVS	74.2
9	TOLUENE	3.058 PPB	118.5
10	UNKNOWN	12.68 MVS	220.6
11	UNKNOWN	10.55 MVS	221.2
12	ETHYLBENZENE	12.44 PPB	247.2
13	M,P-XYLENE	30.50 PPB	262.9
14	O-XYLENE	32.28 PPB	306.9

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-002MW

0.5- 2.5 10G



TIME PRINTED: MAY 6,95 15:59

SAMPLE TIME: MAY 6,95 15:51

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 12 ML/MIN

B/F FLOW 12 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 32 C

MAX GAIN 1000

ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.055 MVS	15.6
2	UNKNOWN	16.14 MVS	17.2
3	UNKNOWN	140.7 MVS	18.8
4	UNKNOWN	29.08 MVS	46.4
5	BENZENE	0.065 PPB	58.7
6	UNKNOWN	4.194 MVS	74.0
7	TOLUENE	2.309 PPB	118.8
8	UNKNOWN	3.213 MVS	220.0
9	ETHYLBENZENE	3.285 PPB	247.4
10	M,P-XYLENE	15.49 PPB	263.2
11	UNKNOWN	0.819 MVS	294.1
12	O-XYLENE	16.70 PPB	310.4

## NOTES

JOE BYRD, JR.

DULUTH ANGB

026-002MW

5.0-7.0 10G

0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 6,95 16:10

SAMPLE TIME: MAY 6,95 16:02

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 12 ML/MIN

B/F FLOW 12 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 32 C

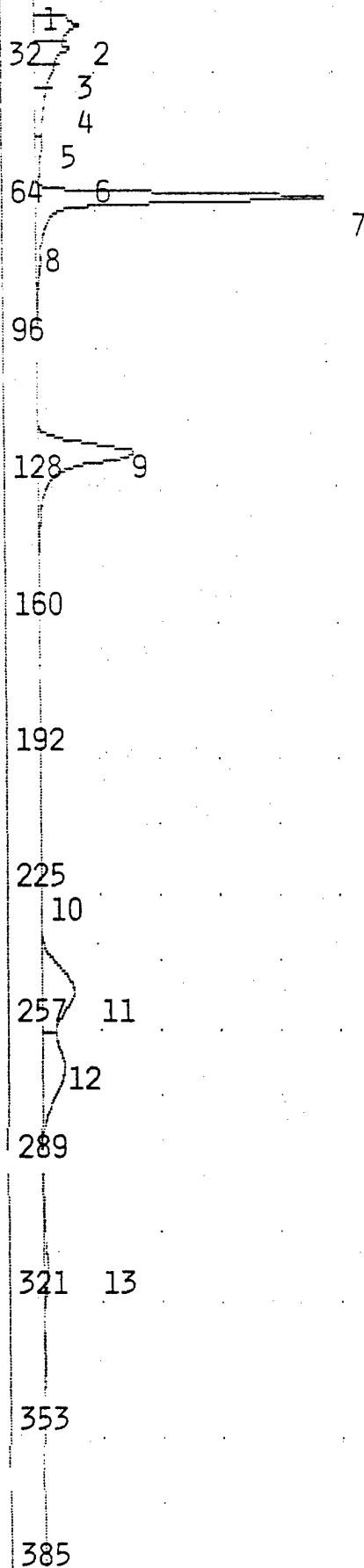
MAX GAIN 1000

ANALYSIS TIME 450.0 SEC

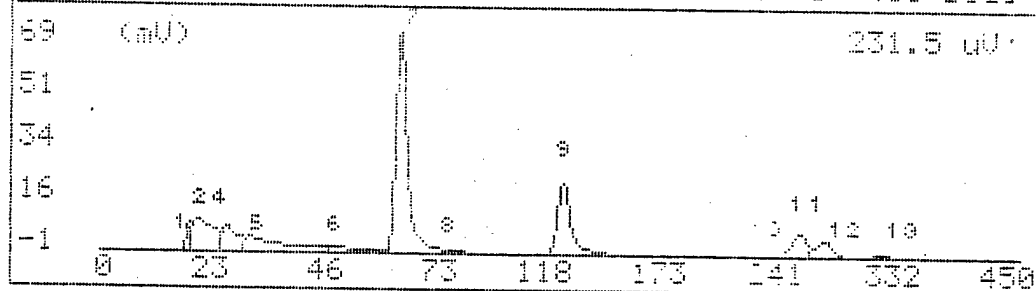
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.043 MVS	15.4
2	UNKNOWN	11.21 MVS	17.2
3	UNKNOWN	47.49 MVS	18.8
4	UNKNOWN	31.49 MVS	24.5
5	UNKNOWN	49.65 MVS	29.2
6	UNKNOWN	16.18 MVS	45.8
7	BENZENE	99.53 PPB	59.0
8	UNKNOWN	1.135 MVS	74.0
9	TOLUENE	90.08 PPB	118.5
10	UNKNOWN	1.173 MVS	221.0
11	ETHYLBENZENE	86.17 PPB	245.8
12	M,P-XYLENE	169.0 PPB	264.2
13	O-XYLENE	77.83 PPB	310.4

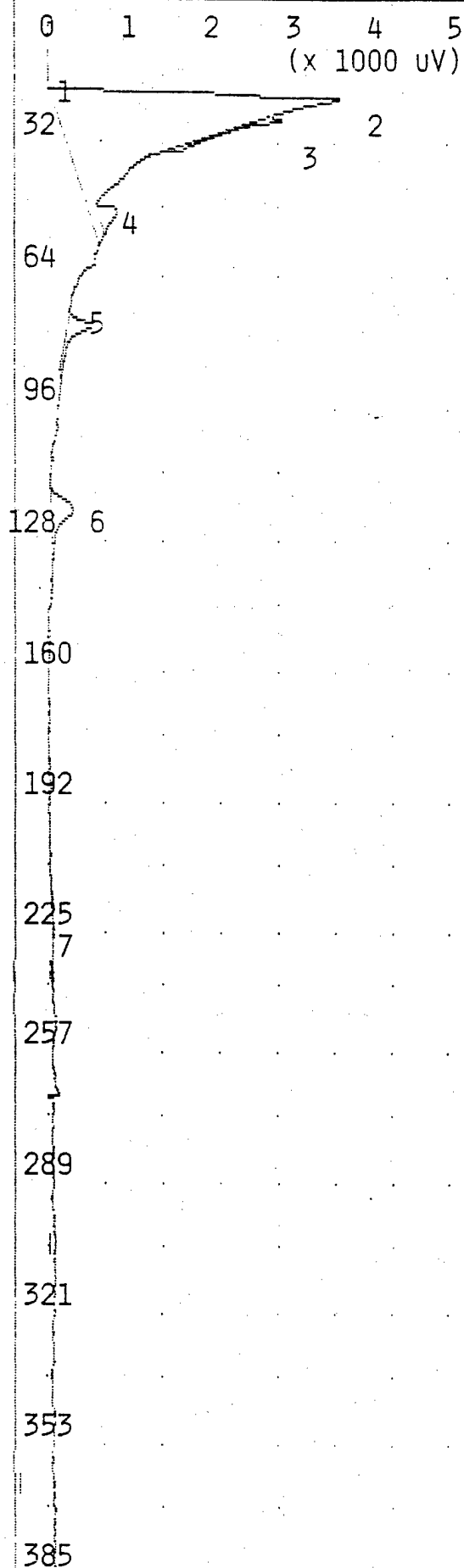
## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

G.C. Ready		185- GC Function		Sta. 6.45	16:15
-- Analysis No 10		-- Run at --		Sta. 6.45	16:02
Pk No	Name	Conc/Area	Alarm	Ret. Time	
5	Unknown	49.65 mUG	---	28.2	sec
6	Unknown	46.18 mUG	---	40.0	sec
7	benzene	90.00 ppb	---	50.0	sec
8	Unknown	1.13 mUG	---	74.0	sec
9	toluene	100.00 ppb	---	110.0	sec
10	Unknown	1.17 mUG	---	221.0	sec
11	ethylbenzene	100.00 ppb	---	340.0	sec
12	m-p-xylene	100.00 ppb	---	364.0	sec
13	o-xylene	100.00 ppb	---	380.4	sec
- Detected 13 peaks. Use + & - to scroll.				455	sec



# ANALYSIS #11 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 6,95 16:24  
 SAMPLE TIME: MAY 6,95 16:16

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 32 C  
 MAX GAIN 1000  
 ANALYSIS TIME 450.0 SEC

## PEAK REPORT

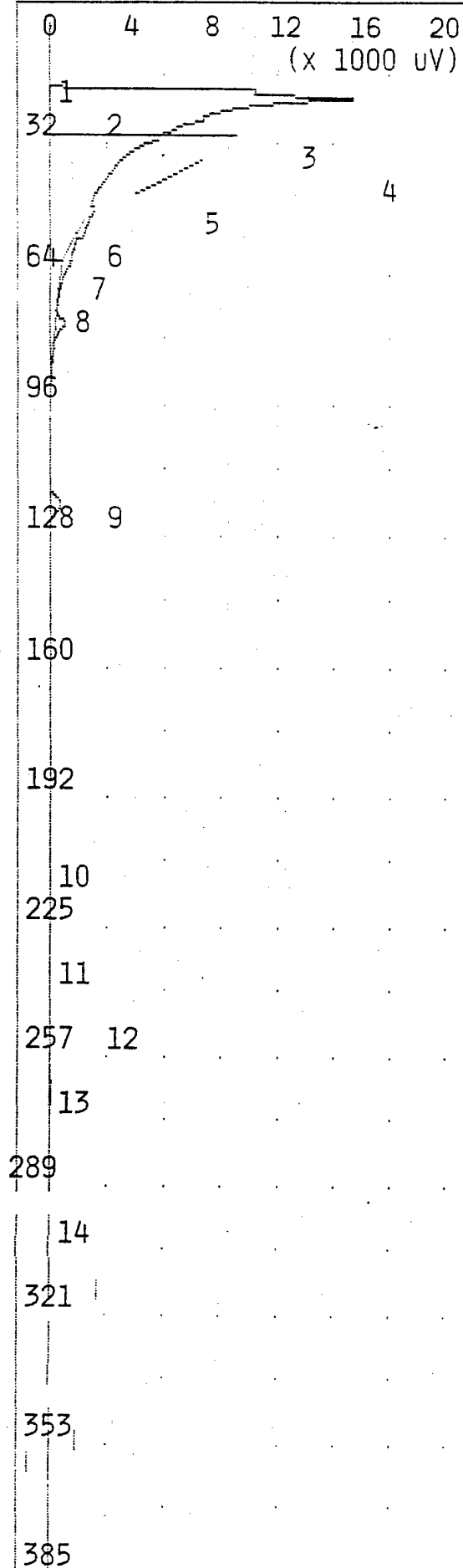
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.036 MVS	15.1
2	UNKNOWN	47.07 MVS	19.0
3	UNKNOWN	0.948 MVS	24.3
4	UNKNOWN	1.060 MVS	46.6
5	UNKNOWN	1.159 MVS	74.6
6	TOLUENE	1.214 PPB	118.6
7	ETHYLBENZENE	0.196 PPB	221.8

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 AIR BLANK



## ANALYSIS #12 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 6,95 16:35

SAMPLE TIME: MAY 6,95 16:27

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

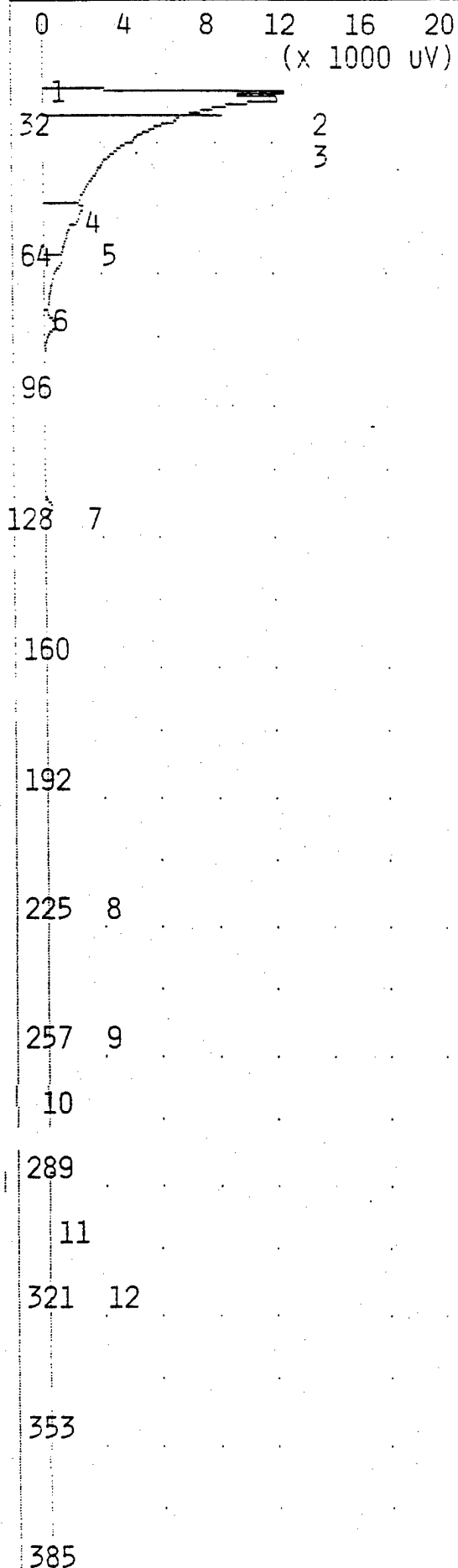
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.046 MVS	13.2
2	UNKNOWN	0.141 MVS	15.7
3	UNKNOWN	14.33 MVS	17.2
4	UNKNOWN	186.6 MVS	18.8
5	UNKNOWN	0.450 MVS	24.2
6	UNKNOWN	3.903 MVS	45.4
7	BENZENE	0.559 PPB	59.3
8	UNKNOWN	1.832 MVS	73.8
9	TOLUENE	3.005 PPB	118.6
10	UNKNOWN	1.907 MVS	204.2
11	UNKNOWN	0.129 MVS	233.6
12	ETHYLBENZENE	2.733 PPB	248.0
13	M,P-XYLENE	8.597 PPB	266.4
14	O-XYLENE	7.251 PPB	293.0

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-002MW  
10.0-12.0 10G

## ANALYSIS #13 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 6,95 16:46

SAMPLE TIME: MAY 5,95 16:38

## METHOD

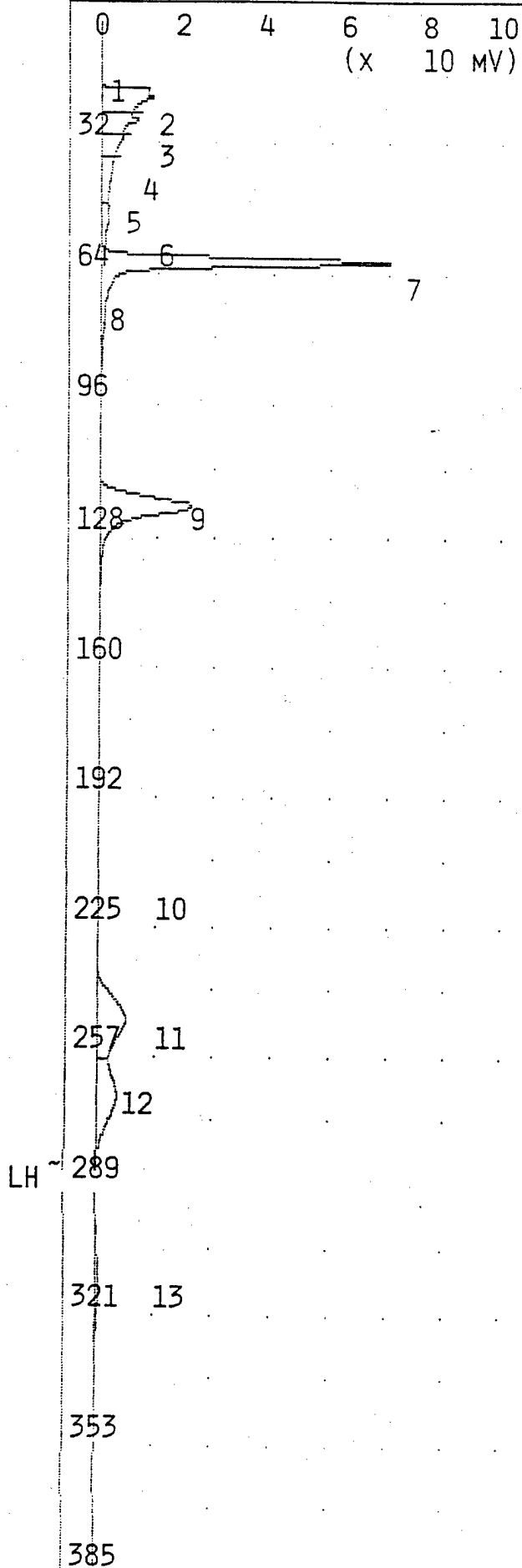
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.062 MVS	16.0
2	UNKNOWN	14.80 MVS	17.6
3	UNKNOWN	128.4 MVS	19.2
4	UNKNOWN	19.73 MVS	46.6
5	BENZENE	3.345 PPB	58.8
6	UNKNOWN	4.052 MVS	74.2
7	TOLUENE	2.511 PPB	118.9
8	UNKNOWN	1.280 MVS	219.2
9	ETHYLBENZENE	1.660 PPB	245.0
10	M,P-XYLENE	7.493 PPB	264.2
11	UNKNOWN	0.300 MVS	295.4
12	O-XYLENE	4.160 PPB	313.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
026-002MW  
15.0-17.0 10G



TIME PRINTED: MAY 6,95 16:56

SAMPLE TIME: MAY 6,95 16:49

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.037 MVS	15.2
2	UNKNOWN	17.16 MVS	17.2
3	UNKNOWN	54.15 MVS	18.8
4	UNKNOWN	34.42 MVS	24.6
5	UNKNOWN	54.19 MVS	29.0
6	UNKNOWN	18.71 MVS	45.8
7	BENZENE	99.81 PPB	59.0
8	UNKNOWN	0.464 MVS	73.8
9	TOLUENE	94.48 PPB	118.5
10	UNKNOWN	1.151 MVS	219.2
11	ETHYLBENZENE	91.20 PPB	245.8
12	M,P-XYLENE	184.7 PPB	264.5
13	O-XYLENE	96.60 PPB	310.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

ANALYSIS #3

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 10 MV)

TIME PRINTED: MAY 8,95 10:17

SAMPLE TIME: MAY 8,95 10:10

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

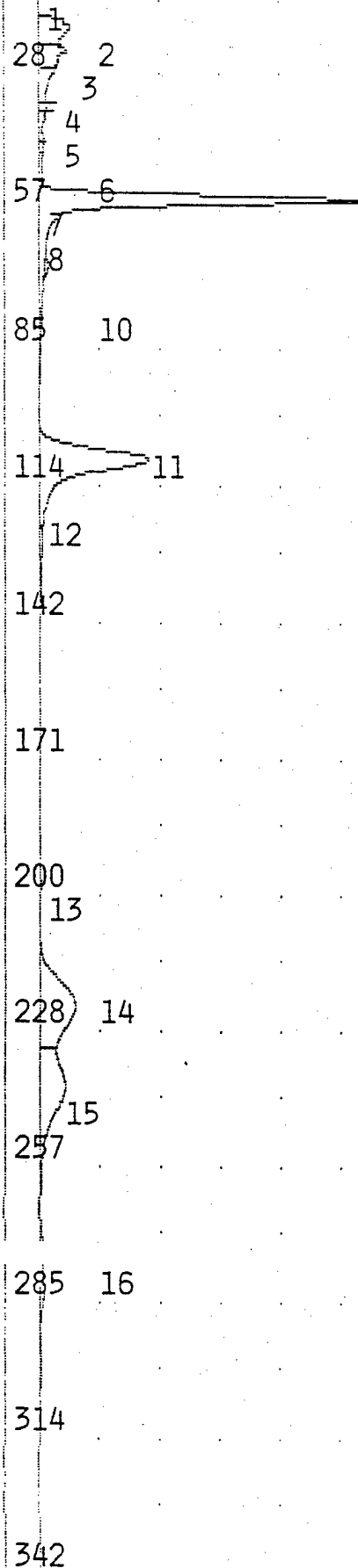
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.086 MVS	14.1
2	UNKNOWN	6.964 MVS	15.5
3	UNKNOWN	31.05 MVS	16.9
4	UNKNOWN	15.11 MVS	22.1
5	UNKNOWN	8.947 MVS	24.3
6	UNKNOWN	17.48 MVS	26.0
7	UNKNOWN	12.30 MVS	33.5
8	UNKNOWN	11.79 MVS	40.6
9	UNKNOWN	229.1 MVS	53.0
10	UNKNOWN	2.303 MVS	66.5
11	UNKNOWN	158.5 MVS	106.6
12	UNKNOWN	6.444 MVS	121.6
13	UNKNOWN	2.258 MVS	195.4
14	UNKNOWN	106.2 MVS	221.6
15	UNKNOWN	84.78 MVS	238.2
16	UNKNOWN	17.20 MVS	278.9

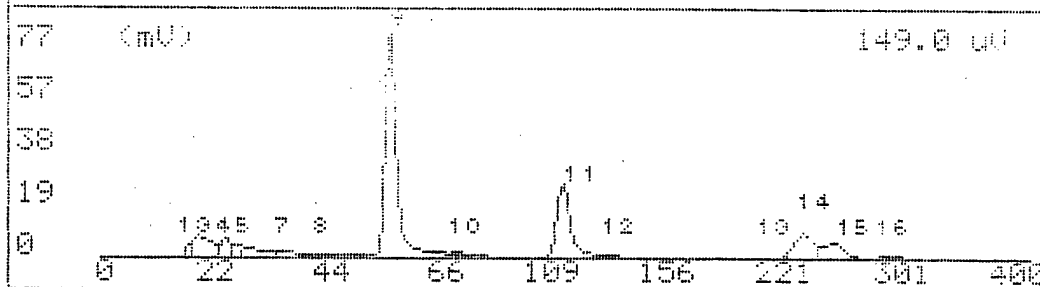
## NOTES

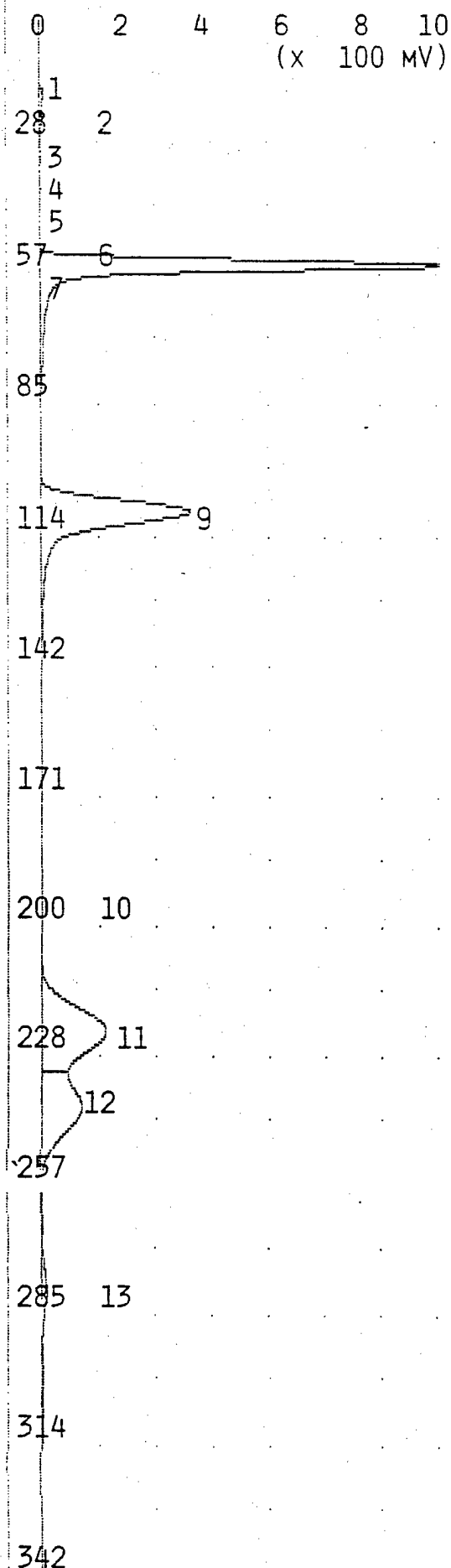
DESTROY GREENWAY (TRAINEE)  
DULUTH ANGB  
100 PPB BTEX

J. BYRD, JR. (OPERATOR)



B.C. Ready		135- GC Function		Met: 3.5	10:28
-- Analysis No 3		-- Run at --		Met: 3.5	10:10
Pk No	Name	Conc/Area	Alarm	Ret. Time	
8	Unknown	11.79	mUS	-No-	40.6 sec
9	Benzene	100.0	ppb	-No-	53.0 sec
10	Unknown	2.303	mUS	-No-	66.5 sec
11	toluene	100.0	ppb	-No-	106.6 sec
12	Unknown	6.484	mUS	-No-	121.0 sec
13	Unknown	2.258	mUS	-No-	195.4 sec
14	ethylbenzene	100.0	ppb	-No-	221.6 sec
15	m,p-xylene	200.0	ppb	-No-	238.2 sec
16	o-xylene	100.0	ppb	-No-	278.9 sec
- Detected 16 peaks. Use + + to scroll. I 405 sec					





TIME PRINTED: MAY 8,95 10:36

SAMPLE TIME: MAY 8,95 10:29

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

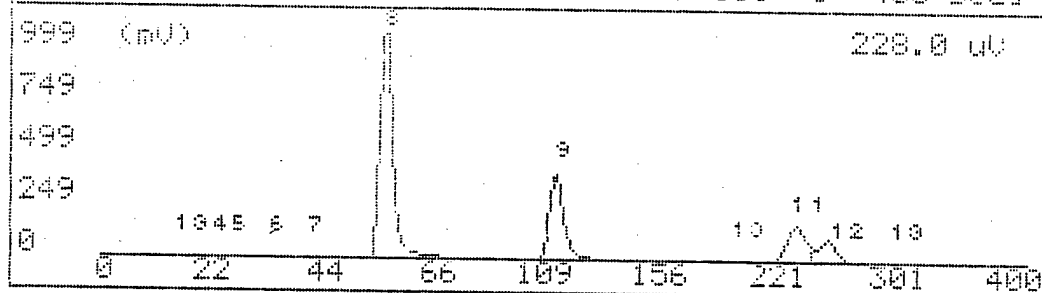
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.057 MVS	13.8
2	UNKNOWN	11.66 MVS	15.4
3	UNKNOWN	44.28 MVS	17.0
4	UNKNOWN	66.64 MVS	22.1
5	UNKNOWN	0.543 MVS	26.0
6	UNKNOWN	0.962 MVS	33.2
7	UNKNOWN	12.23 MVS	40.8
8	BENZENE	1.492 PPM	53.4
9	TOLUENE	1.648 PPM	106.9
10	UNKNOWN	1.098 MVS	192.2
11	ETHYLBENZENE	1.870 PPM	221.2
12	M,P-XYLENE	3.156 PPM	237.8
13	O-XYLENE	1.683 PPM	279.2

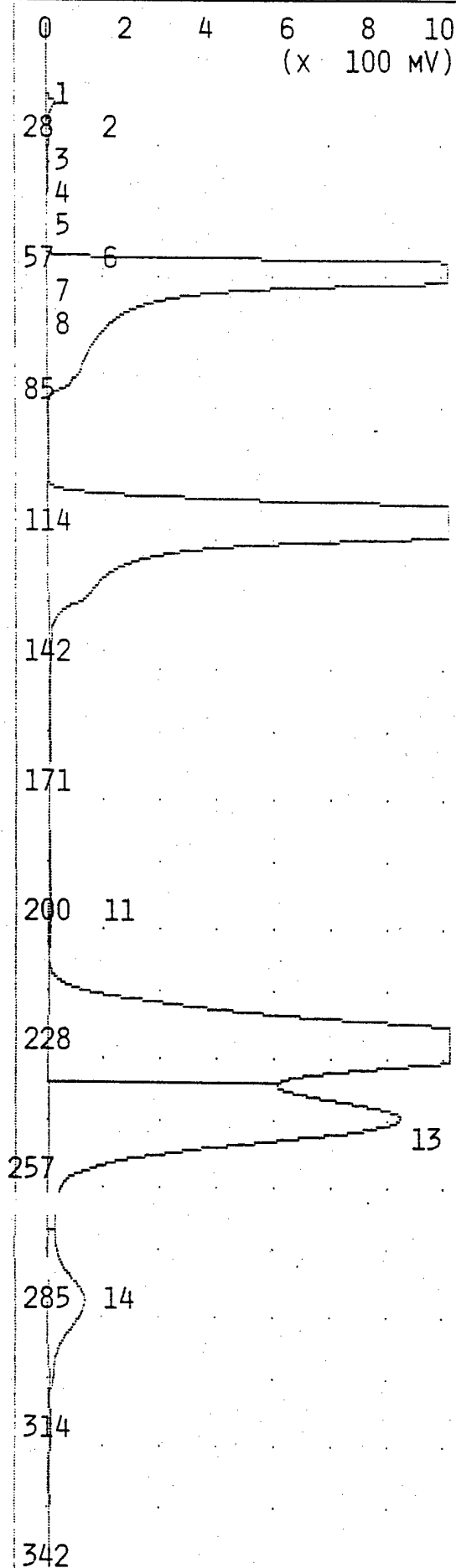
## NOTES

DESTROY GREENWAY (TRAINEE)  
DULUTH ANGB  
1 PPM BTEX

J. BYRD, JR. (OPERATOR)

G.C. Ready		100+ GC Function	8.95	10:43
Analysis No. 4		Run at -	8.95	10:29
PK No	Name	Conc Area	Alarm	Ret. Time
5	Unknown	0.543 mUS	-No-	36.0 sec
6	Unknown	0.982 mUS	-No-	33.2 sec
7	Unknown	13.81 mUS	-No-	40.0 sec
8	benzene	1.003 ppm	-No-	50.4 sec
9	toluene	1.017 ppm	-No-	106.0 sec
10	Unknown	1.098 mUS	-No-	192.2 sec
11	ethylbenzene	1.007 ppm	-No-	221.2 sec
12	m,p-xylene	2.029 ppm	-No-	237.0 sec
13	o-xylene	1.292 ppm	-No-	279.2 sec
- Detected 13 peaks. Use + + to scroll [ 405 sec]				





TIME PRINTED: MAY 8,95 10:51

SAMPLE TIME: MAY 8,95 10:45

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 32 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.037 MVS	14.0
2	UNKNOWN	8.568 MVS	15.6
3	UNKNOWN	72.20 MVS	17.1
4	UNKNOWN	70.96 MVS	22.2
5	UNKNOWN	0.449 MVS	26.2
6	UNKNOWN	19.37 MVS	33.5
7	UNKNOWN	11.09 MVS	40.6
8	UNKNOWN	3.611 MVS	46.4
9	BENZENE	5.418 PPM	54.2
10	TOLUENE	7.524 PPM	108.2
11	UNKNOWN	5.501 MVS	193.2
12	ETHYLBENZENE	9.005 PPM	223.4
13	M,P-XYLENE	16.83 PPM	239.6
14	O-XYLENE	5.844 PPM	280.8

## NOTES

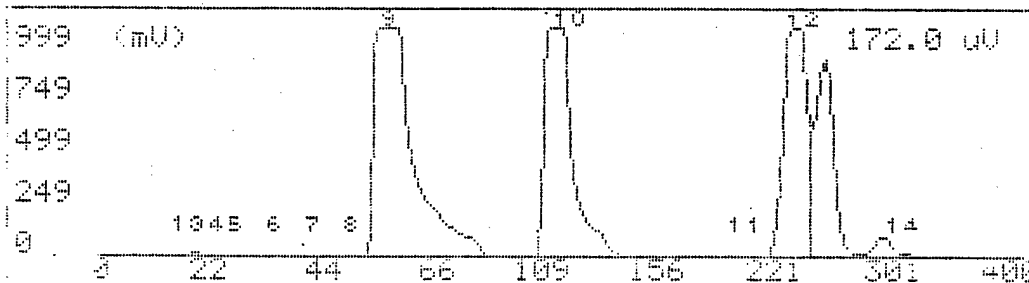
DESTRY GREENWAY (TRAINEE)  
 DULUTH ANGB  
 10 PPM BTEX  
 J. BYRD, JR. (OPERATOR)



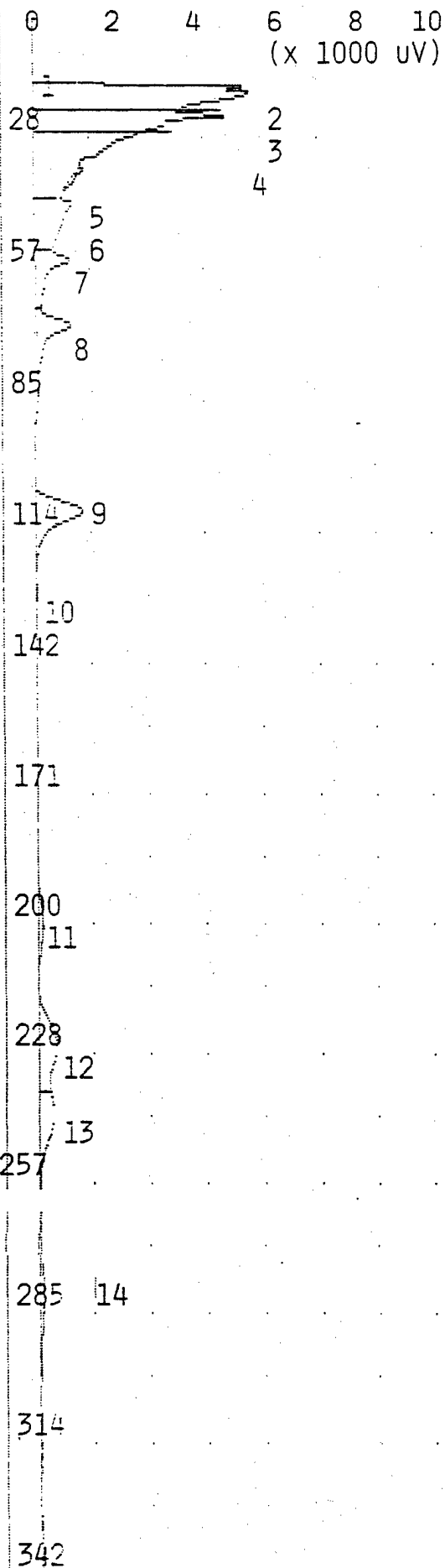
G.C. Ready 108+ GC Function May 8, 95 10:57  
 -- Analysis No 5 -- Run at -- May 8, 95 10:45 --

Pk No	Name	Conc/Area	Alarm	Ret. Time
6	Unknown	19.40 mUS	-No-	33.5 sec
7	Unknown	11.13 mUS	-No-	40.0 sec
8	Unknown	5.640 mUS	-No-	46.4 sec
9	benzene	10.00 ppm	-No-	54.2 sec
10	toluene	10.00 ppm	-No-	100.2 sec
11	Unknown	5.501 mUS	-No-	193.2 sec
12	ethylbenzene	10.00 ppm	-No-	223.4 sec
13	m,p-xylene	20.00 ppm	-No-	239.6 sec
14	o-xylene	10.02 ppm	-No-	286.0 sec

- Detected 14 peaks. Use + + to scroll [ 405 sec]



## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 8, 95 12:07

SAMPLE TIME: MAY 8,95 12:00

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA	0.000	MVSEC
----------	-------	-------

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 14 ML/MIN

B/F FLOW 14 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 32 C

MAX GAIN	1000
----------	------

ANALYSIS TIME 400.0 SEC

# PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.076 MVS	14.1
2	UNKNOWN	5.985 MVS	15.6
3	UNKNOWN	23.16 MVS	17.2
4	UNKNOWN	38.31 MVS	22.2
5	UNKNOWN	0.409 MVS	33.8
6	UNKNOWN	8.861 MVS	40.8
7	BENZENE	2.184 PPB	53.2
8	UNKNOWN	4.767 MVS	67.2
9	TOLUENE	8.239 PPB	108.0
10	UNKNOWN	3.575 MVS	125.2
11	UNKNOWN	3.601 MVS	199.0
12	ETHYLBENZENE	7.450 PPB	224.8
13	M,P-XYLENE	12.76 PPB	240.0
14	O-XYLENE	13.91 PPB	276.2

## NOTES

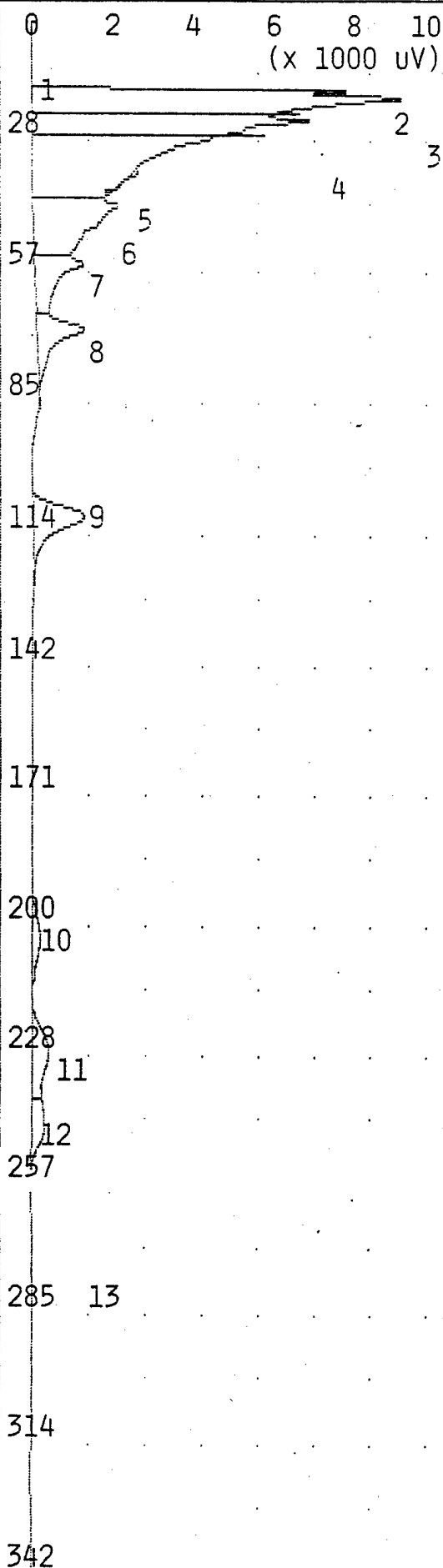
DESTROY GREENWAY (TRAINEE)

DULUTH ANGB

AIR BLANK

J. BYRD, JR. (OPERATOR)

ANALYSIS #10 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 8,95 13:03  
SAMPLE TIME: MAY 8,95 12:56

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

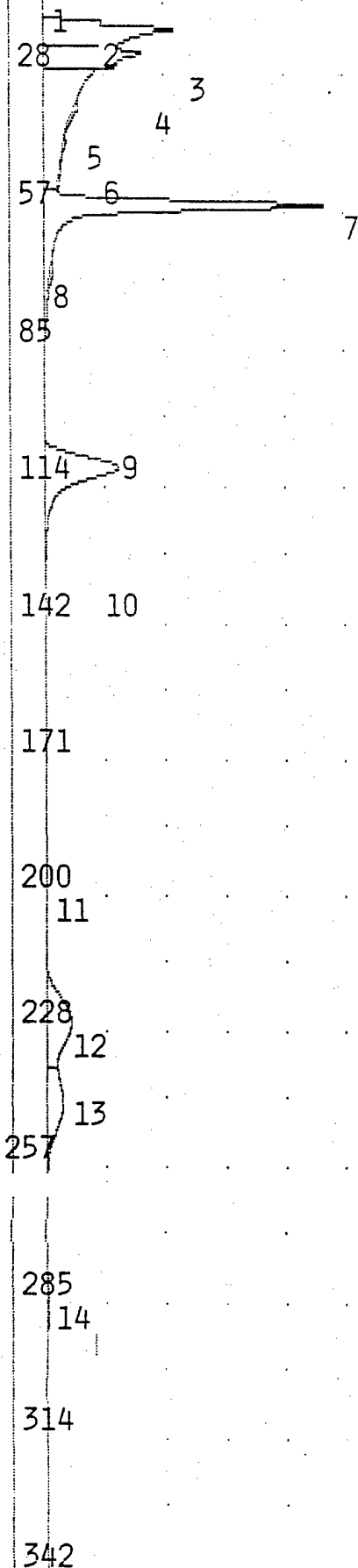
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.090 MVS	14.2
2	UNKNOWN	8.805 MVS	15.7
3	UNKNOWN	38.35 MVS	17.1
4	UNKNOWN	66.22 MVS	22.4
5	UNKNOWN	0.200 MVS	33.8
6	UNKNOWN	18.82 MVS	40.8
7	BENZENE	3.501 PPB	53.6
8	UNKNOWN	7.348 MVS	67.6
9	TOLUENE	5.687 PPB	108.2
10	UNKNOWN	5.390 MVS	201.8
11	ETHYLBENZENE	7.190 PPB	225.8
12	M,P-XYLENE	12.61 PPB	241.0
13	O-XYLENE	10.59 PPB	276.0

NOTES

DESTROY GREENWAY (TRAINEE)  
DULUTH ANG  
026-002MW  
20.0-22.0 10G  
J. BYRD, JR. (OPERATOR)

## ANALYTIC #11 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 8,95 13:13

SAMPLE TIME: MAY 8,95 13:07

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.073 MVS	14.1
2	UNKNOWN	15.64 MVS	15.7
3	UNKNOWN	113.8 MVS	17.1
4	UNKNOWN	247.1 MVS	22.4
5	UNKNOWN	2.439 MVS	33.8
6	UNKNOWN	3.491 MVS	41.0
7	BENZENE	98.54 PPB	53.7
8	UNKNOWN	1.653 MVS	67.4
9	TOLUENE	80.12 PPB	108.2
10	UNKNOWN	2.313 MVS	134.1
11	UNKNOWN	1.798 MVS	199.6
12	ETHYLBENZENE	71.95 PPB	224.6
13	M,P-XYLENE	132.6 PPB	241.3
14	O-XYLENE	47.18 PPB	282.9

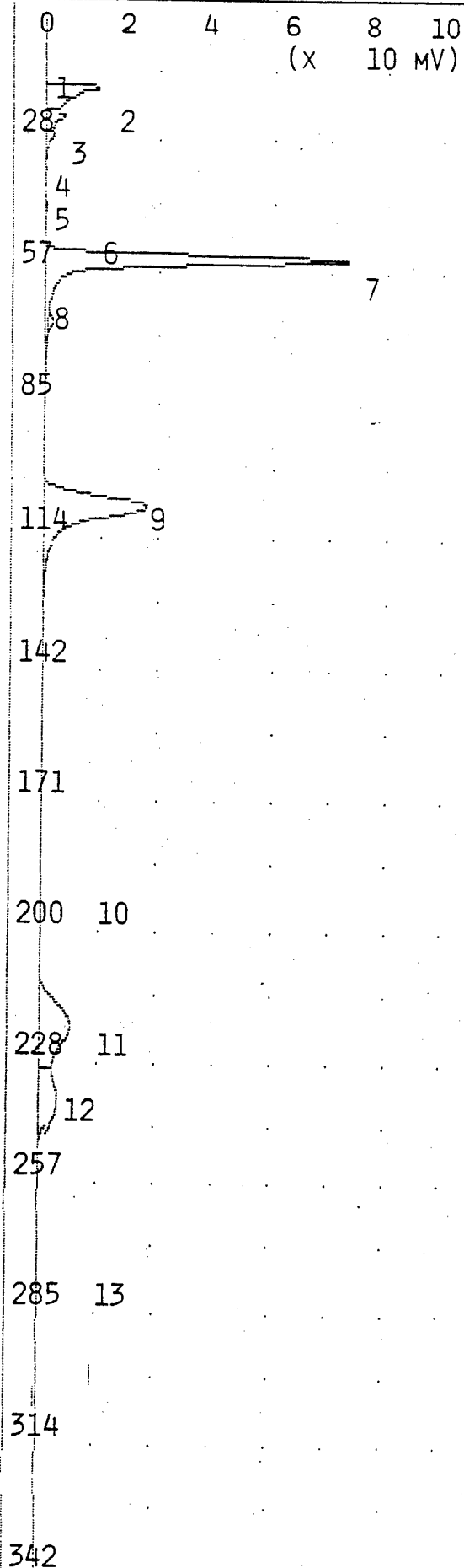
## NOTES

DESTROY GREENWAY (TRAINEE)  
DULUTH ANGB  
100 PPB BTEX STANDARD

J. BYRD, JR. (OPERATOR)

ANALYSIS #1

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 11,95 08:01

SAMPLE TIME: MAY 11,95 07:54

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 28 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

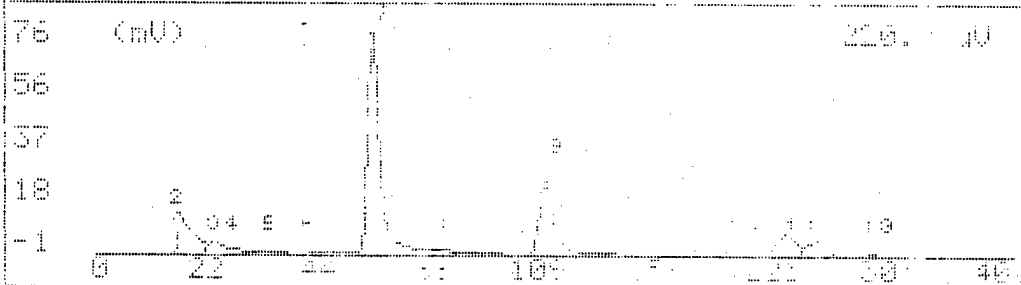
## PEAK REPORT

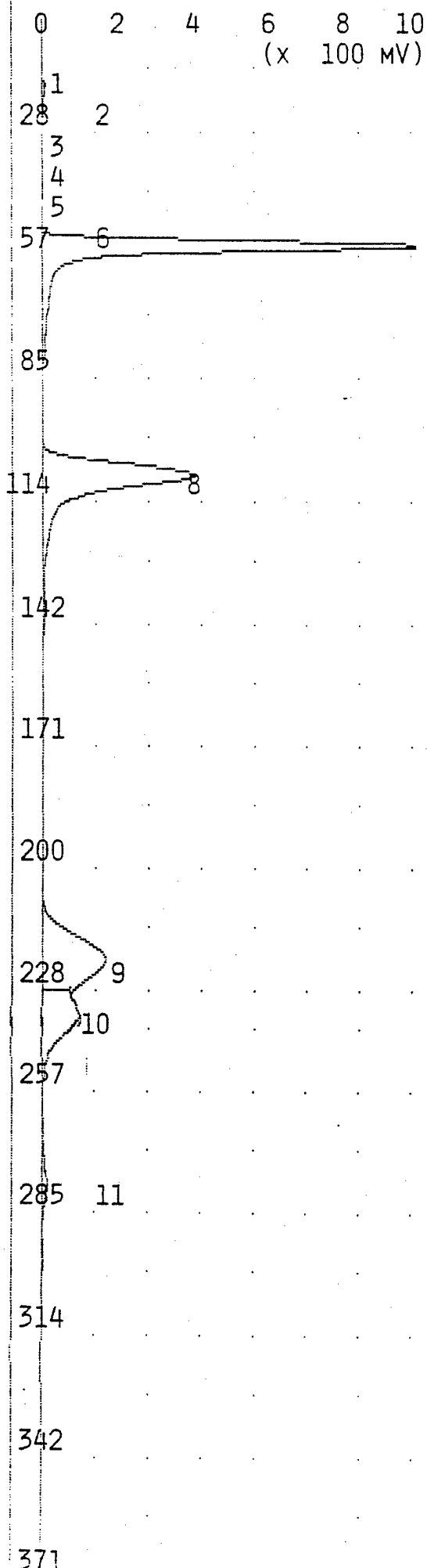
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.084 MVS	14.0
2	UNKNOWN	47.29 MVS	15.3
3	UNKNOWN	15.14 MVS	21.8
4	UNKNOWN	9.843 MVS	25.9
5	UNKNOWN	3.327 MVS	33.0
6	UNKNOWN	7.071 MVS	41.0
7	UNKNOWN	238.5 MVS	52.4
8	UNKNOWN	3.147 MVS	66.0
9	UNKNOWN	170.2 MVS	105.4
10	UNKNOWN	1.826 MVS	192.2
11	UNKNOWN	104.2 MVS	218.8
12	UNKNOWN	73.10 MVS	234.8
13	UNKNOWN	13.85 MVS	275.4

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 100 PPB BTEX STANDARD

E.C. Ready		100	EL Function	1.0	57	100
-- Analysts No			Run At	1.0	57	100
PK No	Name	Conc/Area	Area	Ref	Ref	Ref
5	Unknown	1.327	0.02	1.0	57	100
6	Unknown	1.327	0.02	1.0	57	100
7	benzene	100.0	0.02	1.0	57	100
8	Unknown	1.147	0.02	1.0	57	100
9	toluene	100.0	0.02	1.0	57	100
10	Unknown	1.327	0.02	1.0	57	100
11	ethylbenzene	100.0	0.02	1.0	57	100
12	m,p-xylene	100.0	0.02	1.0	57	100
13	o-xylene	100.0	0.02	1.0	57	100
- Detected 13 peaks. See + + to 1000						





TIME PRINTED: MAY 11,95 08:17

SAMPLE TIME: MAY 11,95 08:10

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 29 C  
 MAX GAIN 1000

ANALYSIS TIME 400.0 SEC

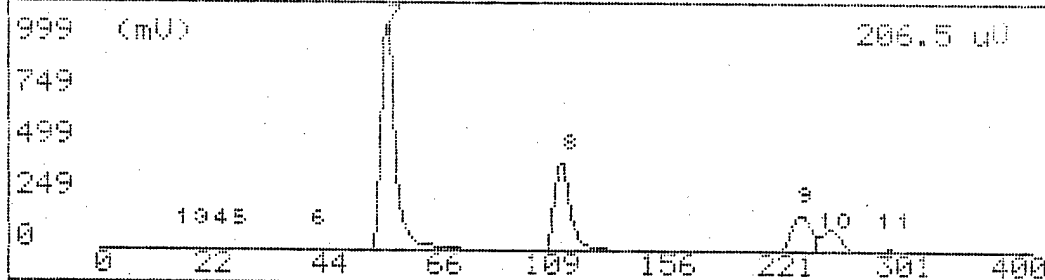
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.092 MVS	14.0
2	UNKNOWN	14.71 MVS	15.3
3	UNKNOWN	34.69 MVS	16.8
4	UNKNOWN	20.17 MVS	21.9
5	UNKNOWN	19.19 MVS	25.8
6	UNKNOWN	7.857 MVS	41.0
7	BENZENE	1.579 PPM	52.9
8	TOLUENE	1.844 PPM	106.2
9	ETHYLBENZENE	2.122 PPM	219.6
10	M,P-XYLENE	3.912 PPM	235.6
11	O-XYLENE	2.662 PPM	276.5

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 1 PPM BTEX STANDARD

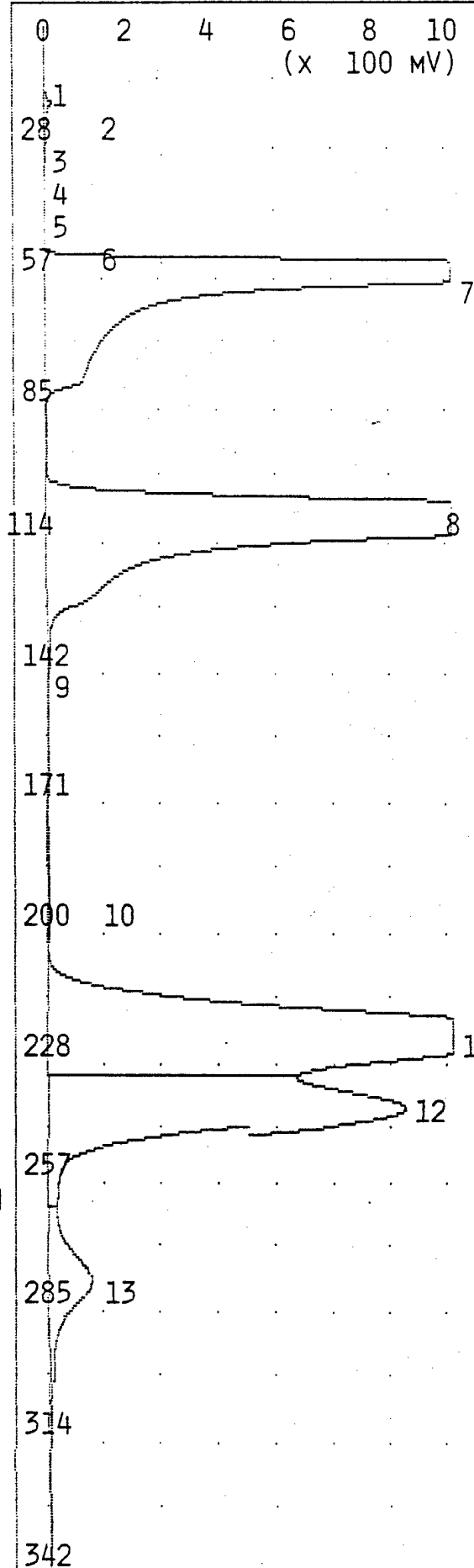
G.C. Ready 16S+ GC Function May 11 95 06:12					
-- Analysis No 2 -- Run at -- May 11 95 06:10 --					
PK No	Name	Conc	Area	Alarm	Ret. Time
3	Unknown	34.119	mUS	-No-	16.40 sec
4	Unknown	26.437	mUS	-No-	21.00 sec
5	Unknown	19.722	mUS	-No-	25.00 sec
6	Unknown	7.9300	mUS	-No-	41.00 sec
7	benzene	1.0000	ppm	-No-	52.00 sec
8	toluene	1.0000	ppm	-No-	106.00 sec
9	ethylbenzene	1.0000	ppm	-No-	219.00 sec
10	m-p-xylene	2.0000	ppm	-No-	240.00 sec
11	o-xylene	1.0000	ppm	-No-	278.00 sec
- Detected 11 peaks. Use + + to scroll [ 405 sec]					





## ANALYSIS #3

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 11, 95 08:31

SAMPLE TIME: MAY 11, 95 08:24

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 14 ML/MIN

B/F FLOW 14 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 29 C

MAX GAIN 1000

ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.109 MVS	13.8
2	UNKNOWN	12.12 MVS	15.2
3	UNKNOWN	62.90 MVS	16.8
4	UNKNOWN	27.77 MVS	21.9
5	UNKNOWN	37.16 MVS	25.8
6	UNKNOWN	9.167 MVS	40.5
7	BENZENE	5.231 PPM	53.7
8	TOLUENE	6.822 PPM	107.0
9	UNKNOWN	68.48 MVS	142.9
10	UNKNOWN	8.051 MVS	189.4
11	ETHYLBENZENE	8.435 PPM	220.4
12	M,P-XYLENE	15.70 PPM	236.4
13	O-XYLENE	5.318 PPM	276.8

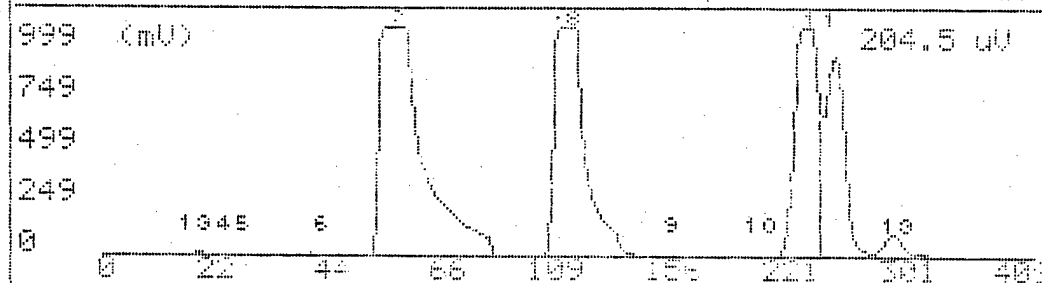
## NOTES

JOE BYRD, JR.

DULUTH ANGB

10 PPM BTEX STANDAR

G.C. Ready		108+ GC Function		May 11-95	08:36
-- Analysis No 3		-- Run at --		May 11-95	08:24
Pk No	Name	Conc/Area	Alarm	Ret. Time	
5	Unknown	37.16 mUS	-No-	25.6	sec
6	Unknown	9.167 mUS	-No-	40.5	sec
7	benzene	10.00 ppm	-No-	50.7	sec
8	toluene	10.00 ppm	-No-	107.0	sec
9	Unknown	68.48 mUS	-No-	142.9	sec
10	Unknown	8.051 mUS	-No-	189.4	sec
11	ethylbenzene	10.00 ppm	-No-	220.4	sec
12	m,p-xylene	20.00 ppm	-No-	236.4	sec
13	o-xylene	10.02 ppm	-No-	276.8	sec
- Detected 13 peaks. Use + + to scroll					[ 405 sec]



0 2 4 6 8 10  
(x 1000 uV)

TIME PRINTED: MAY 11,95 08:43

SAMPLE TIME: MAY 11,95 08:37

## METHOD

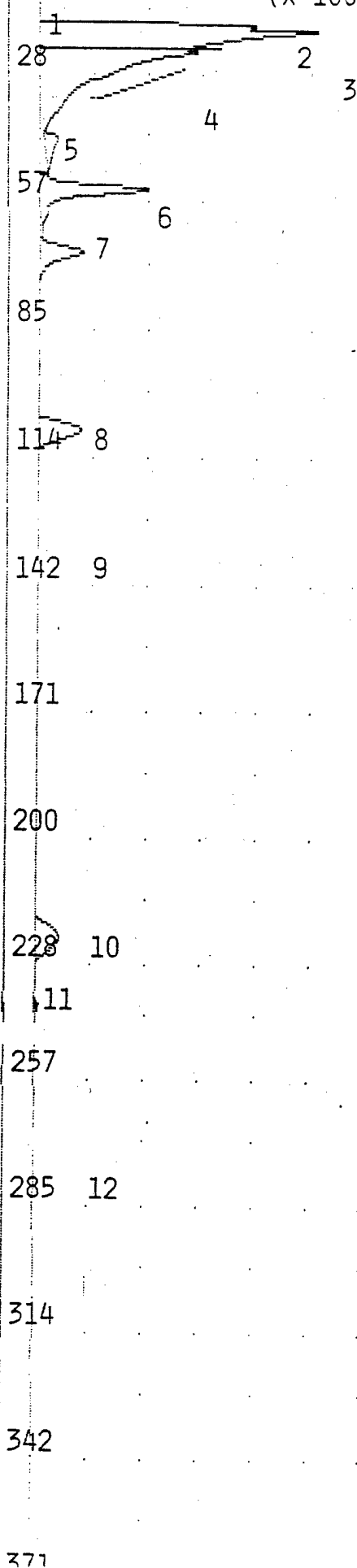
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

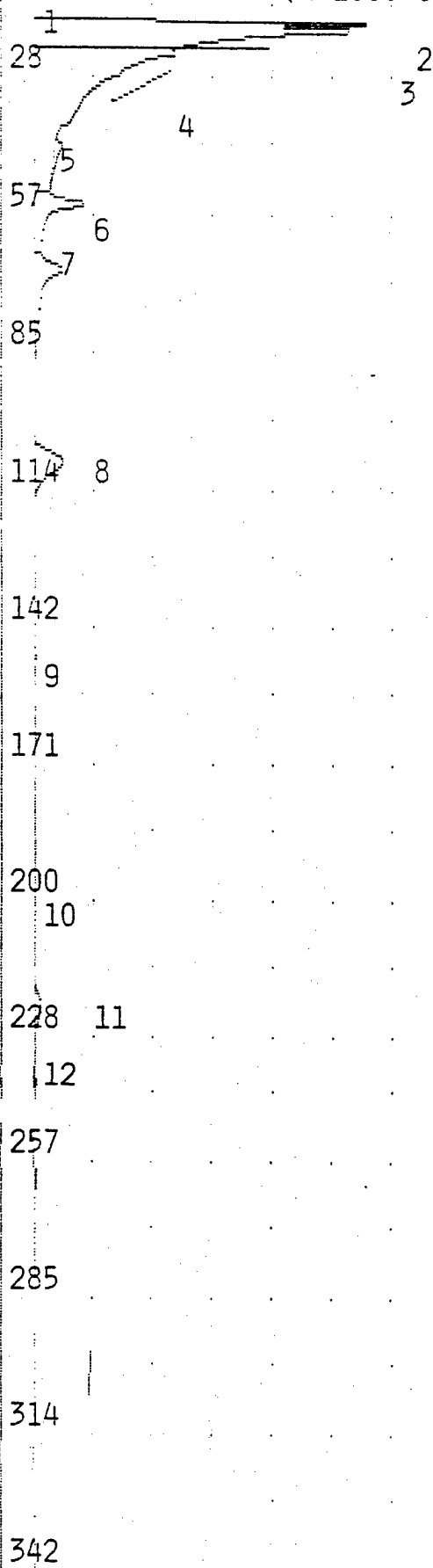
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.109 MVS	13.8
2	UNKNOWN	6.790 MVS	15.4
3	UNKNOWN	75.27 MVS	16.9
4	UNKNOWN	0.583 MVS	21.7
5	UNKNOWN	1.864 MVS	41.6
6	BENZENE	8.416 PPB	52.5
7	UNKNOWN	31.31 MVS	66.4
8	TOLUENE	17.84 PPB	106.2
9	UNKNOWN	1.272 MVS	131.0
10	ETHYLBENZENE	21.50 PPB	220.6
11	M,P-XYLENE	51.14 PPB	236.6
12	O-XYLENE	21.45 PPB	276.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK



0 4 8 12 16 20  
(x 1000 UV)



TIME PRINTED: MAY 11,95 08:54

SAMPLE TIME: MAY 11,95 08:47

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.065 MVS	13.8
2	UNKNOWN	18.17 MVS	15.6
3	UNKNOWN	128.6 MVS	17.1
4	UNKNOWN	0.478 MVS	22.0
5	UNKNOWN	1.634 MVS	40.9
6	BENZENE	5.813 PPB	52.8
7	UNKNOWN	14.78 MVS	66.4
8	TOLUENE	6.031 PPB	106.5
9	UNKNOWN	0.885 MVS	147.2
10	UNKNOWN	0.988 MVS	196.2
11	ETHYLBENZENE	8.347 PPB	220.2
12	M,P-XYLENE	18.19 PPB	235.2

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-001MW  
0.5- 2.5 10G

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 11,95 09:04

SAMPLE TIME: MAY 11,95 08:57

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	13.02 MVS	15.4
2	UNKNOWN	142.8 MVS	17.0
3	UNKNOWN	0.893 MVS	21.9
4	UNKNOWN	1.472 MVS	40.9
5	BENZENE	0.867 PPB	52.8
6	UNKNOWN	3.967 MVS	66.6
7	TOLUENE	3.873 PPB	106.6
8	UNKNOWN	7.840 MVS	197.8
9	UNKNOWN	2.642 MVS	216.8
10	ETHYLBENZENE	8.407 PPB	220.2
11	M,P-XYLENE	20.59 PPB	237.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-001MW  
5.0- 7.0 10G

0 4 8 12 16 20  
(x 1000 uV)

TIME PRINTED: MAY 11,95 09:14

SAMPLE TIME: MAY 11,95 09:07

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.549 MVS	13.9
2	UNKNOWN	16.42 MVS	15.3
3	UNKNOWN	42.95 MVS	16.8
4	UNKNOWN	54.88 MVS	21.8
5	UNKNOWN	10.85 MVS	40.8
6	BENZENE	2.496 PPB	52.9
7	UNKNOWN	6.488 MVS	66.5
8	TOLUENE	3.826 PPB	106.8
9	UNKNOWN	20.58 MVS	198.8
10	ETHYLBENZENE	13.00 PPB	221.2
11	M,P-XYLENE	19.44 PPB	237.2

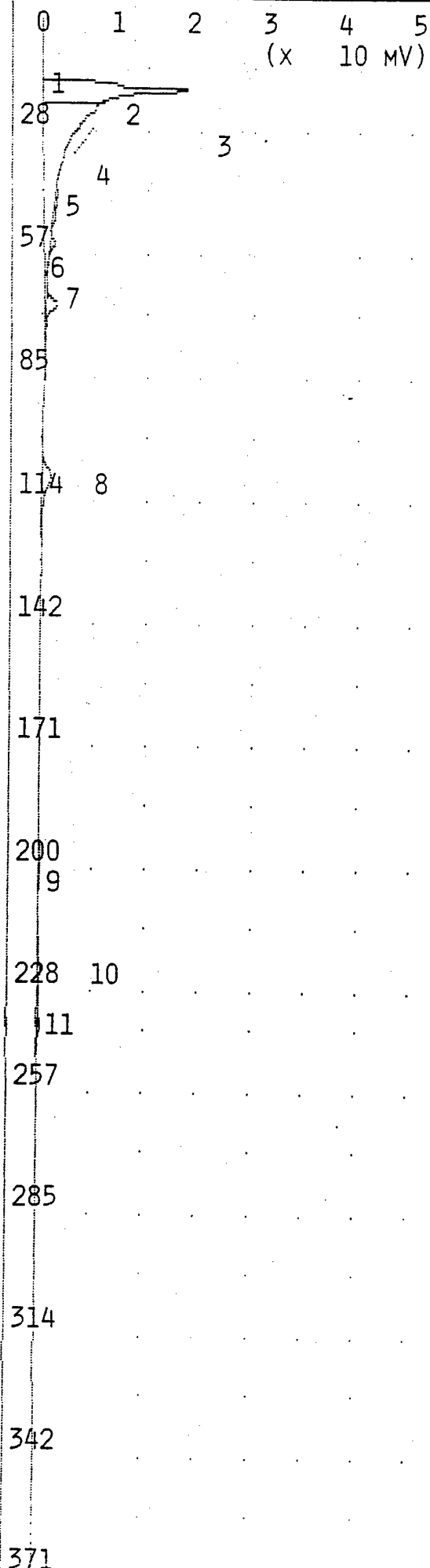
## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-001MW

10.0-12.0 10G



TIME PRINTED: MAY 11,95 09:24

SAMPLE TIME: MAY 11,95 09:17

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 30 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.023 MVS	13.6
2	UNKNOWN	10.91 MVS	15.4
3	UNKNOWN	163.0 MVS	16.9
4	UNKNOWN	0.510 MVS	21.8
5	UNKNOWN	1.974 MVS	41.0
6	BENZENE	0.538 PPB	52.6
7	UNKNOWN	5.595 MVS	66.5
8	TOLUENE	4.293 PPB	106.8
9	UNKNOWN	1.612 MVS	198.4
10	ETHYLBENZENE	3.302 PPB	222.4
11	M,P-XYLENE	10.60 PPB	237.0

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-001MW  
 15.0-17.0 10G

0 1 2 3 4 5  
(X 10 MV)

TIME PRINTED: MAY 11,95 09:34

SAMPLE TIME: MAY 11,95 09:28

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

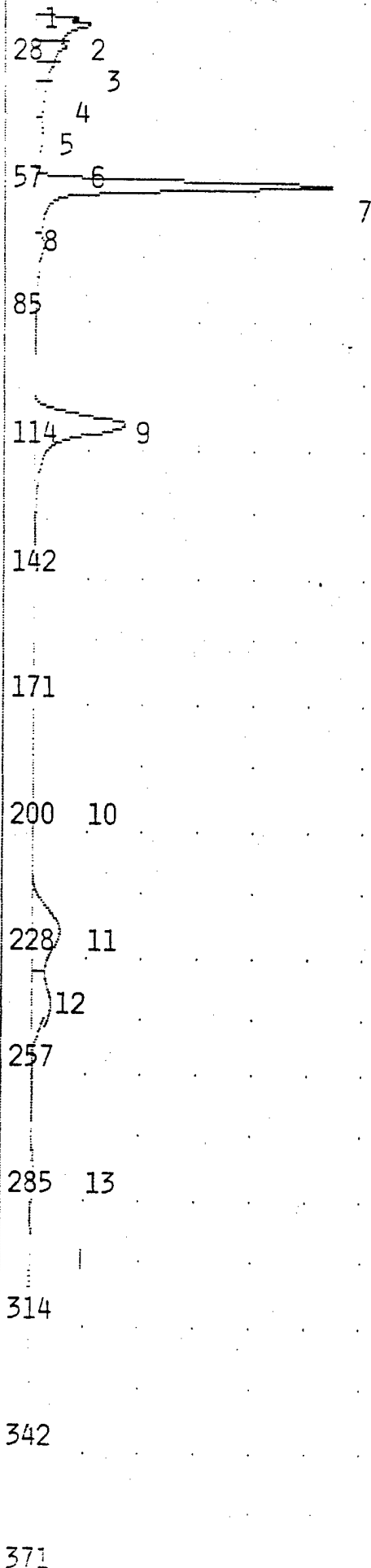
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	11.31 MVS	15.4
2	UNKNOWN	230.9 MVS	16.8
3	UNKNOWN	1.058 MVS	21.8
4	UNKNOWN	0.781 MVS	40.8
5	BENZENE	0.853 PPB	52.8
6	UNKNOWN	4.015 MVS	66.4
7	TOLUENE	3.931 PPB	106.9
8	UNKNOWN	0.980 MVS	199.2
9	ETHYLBENZENE	2.896 PPB	222.2
10	M,P-XYLENE	8.366 PPB	237.2

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-001MW  
20.0-22.0 10G



0 2 4 6 8 10  
(X 10 MV)



TIME PRINTED: MAY 11,95 09:44

SAMPLE TIME: MAY 11,95 09:38

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.058 MVS	13.7
2	UNKNOWN	12.61 MVS	15.5
3	UNKNOWN	49.87 MVS	17.0
4	UNKNOWN	28.65 MVS	22.1
5	UNKNOWN	40.87 MVS	26.0
6	UNKNOWN	18.72 MVS	40.7
7	BENZENE	90.56 PPB	53.0
8	UNKNOWN	25.81 MVS	66.6
9	TOLUENE	87.03 PPB	106.5
10	UNKNOWN	1.235 MVS	195.0
11	ETHYLBENZENE	89.03 PPB	220.8
12	M,P-XYLENE	193.3 PPB	237.2
13	O-XYLENE	86.62 PPB	278.4

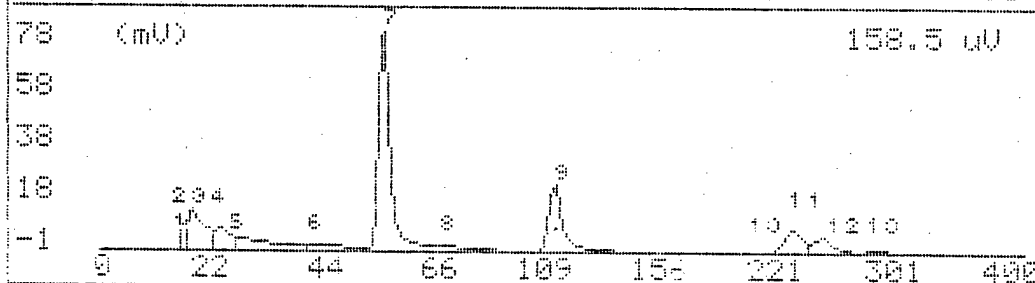
## NOTES

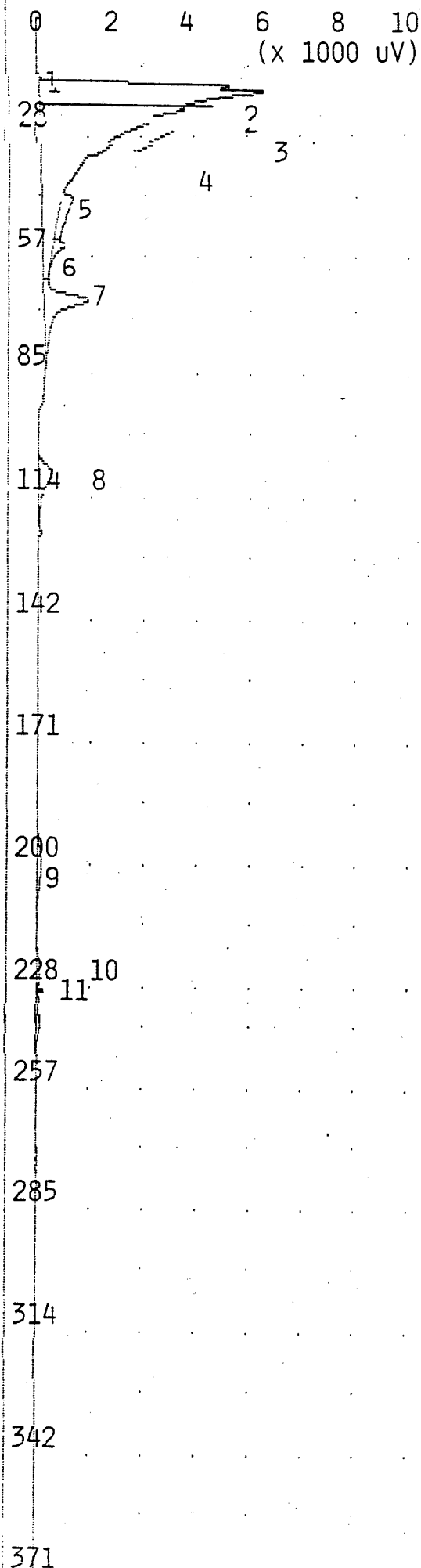
JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

S.C. Ready 125+ 30 Function Ret: 11.95 00:49  
 -- Analysis No 10 -- Run at -- Ret: 11.95 00:50 --

Pk No	Name	Conc	Area	Alarm	Ret. Time
5	Unknown	40.87	mV	-No-	26.0 sec
6	Unknown	18.72	mV	-No-	40.7 sec
7	Benzene	99.99	ppb	-No-	50.0 sec
8	Unknown	25.81	mV	-No-	66.0 sec
9	Toluene	100.0	ppb	-No-	100.0 sec
10	Unknown	1.235	mV	-No-	100.0 sec
11	ethylbenzene	99.99	ppb	-No-	200.0 sec
12	m,p-xylene	200.0	ppb	-No-	207.2 sec
13	o-xylene	100.0	ppb	-No-	276.4 sec

- Detected 13 peaks. Use + + to scroll. [ 405 sec]





TIME PRINTED: MAY 11,95 09:57

SAMPLE TIME: MAY 11,95 09:50

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.279 MVS	14.0
2	UNKNOWN	5.590 MVS	15.5
3	UNKNOWN	68.33 MVS	16.9
4	UNKNOWN	0.416 MVS	21.8
5	UNKNOWN	2.456 MVS	41.4
6	BENZENE	0.367 PPB	52.4
7	UNKNOWN	6.480 MVS	66.6
8	TOLUENE	1.803 PPB	106.9
9	UNKNOWN	4.480 MVS	198.6
10	ETHYLBENZENE	2.298 PPB	220.6
11	UNKNOWN	4.276 MVS	227.2

## NOTES

JOE BYRD, JR.  
 DULUTH ANG

~~100 PPB BTEX~~ 13  
 AIR BLANK

## ANALYSIS #12 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 11,95 10:08

SAMPLE TIME: MAY 11,95 10:02

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 14 ML/MIN

B/F FLOW 14 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 31 C

MAX GAIN 1000

ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.038 MVS	13.6
2	UNKNOWN	16.49 MVS	15.5
3	UNKNOWN	101.0 MVS	16.8
4	UNKNOWN	0.359 MVS	21.8
5	UNKNOWN	13.46 MVS	40.9
6	BENZENE	2.862 PPB	52.8
7	UNKNOWN	6.725 MVS	66.9
8	TOLUENE	3.946 PPB	106.9
9	UNKNOWN	2.595 MVS	198.8
10	ETHYLBENZENE	1.967 PPB	223.2
11	M,P-XYLENE	4.725 PPB	238.2

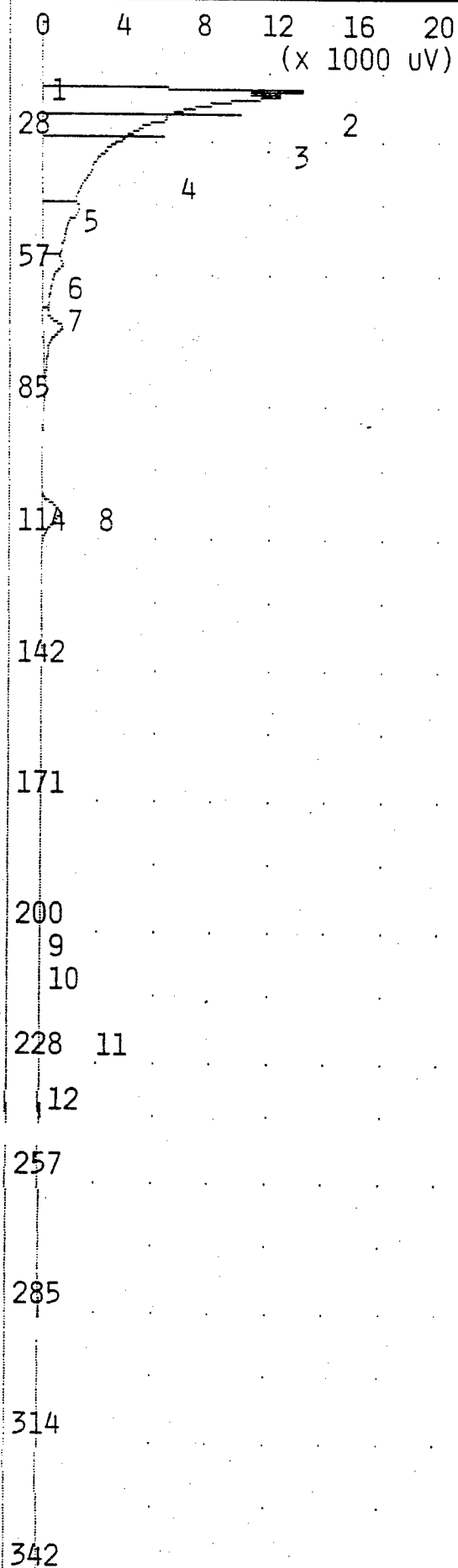
## NOTES

JOE BYRD, JR.

DULUTH ANG

025-001MW

25.0-27.0 10G



TIME PRINTED: MAY 11, 95 10:19

SAMPLE TIME: MAY 11, 95 10:12

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.033 MVS	13.7
2	UNKNOWN	15.19 MVS	15.5
3	UNKNOWN	44.66 MVS	16.9
4	UNKNOWN	61.80 MVS	21.9
5	UNKNOWN	15.08 MVS	40.7
6	BENZENE	2.966 PPB	52.5
7	UNKNOWN	5.615 MVS	66.6
8	TOLUENE	4.089 PPB	106.6
9	UNKNOWN	3.376 MVS	198.4
10	UNKNOWN	4.178 MVS	201.6
11	ETHYLBENZENE	4.732 PPB	223.4
12	M,P-XYLENE	8.636 PPB	236.8

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-001MW  
 30.0-32.0 10G

## ANALYTIC #14 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 11,95 10:29

SAMPLE TIME: MAY 11,95 10:22

## METHOD

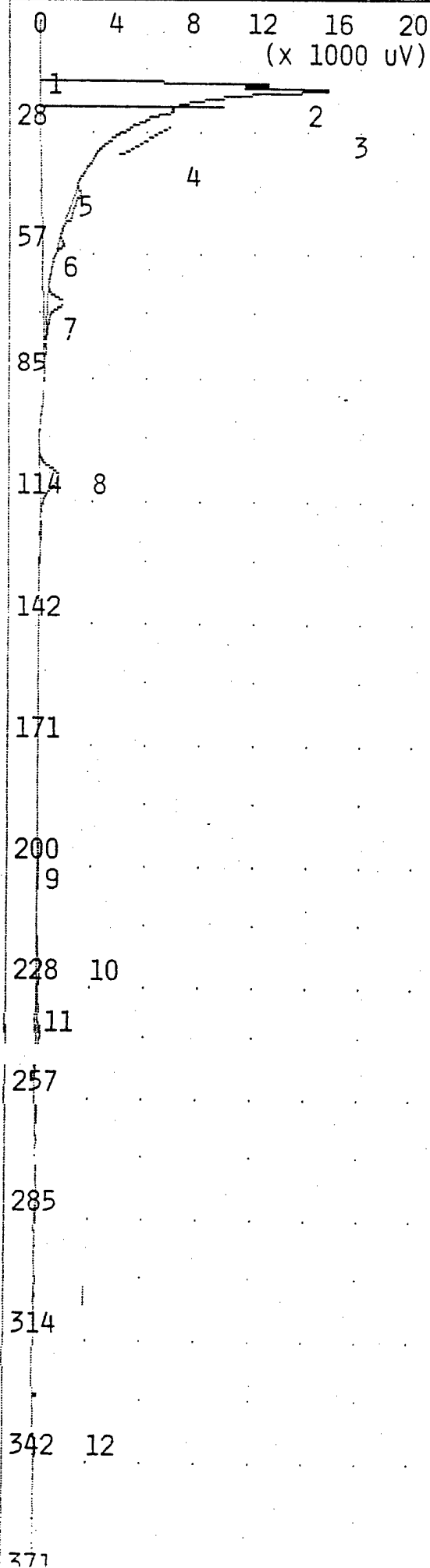
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	13.95 MVS	15.5
2	UNKNOWN	164.0 MVS	17.0
3	UNKNOWN	0.404 MVS	22.0
4	UNKNOWN	1.981 MVS	40.8
5	BENZENE	0.211 PPB	52.8
6	UNKNOWN	3.515 MVS	66.8
7	TOLUENE	3.644 PPB	106.8
8	UNKNOWN	7.567 MVS	197.0
9	ETHYLBENZENE	17.75 PPB	222.0
10	M,P-XYLENE	29.24 PPB	238.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-001MW  
35.0-37.0 10G



TIME PRINTED: MAY 11,95 10:39

SAMPLE TIME: MAY 11,95 10:32

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

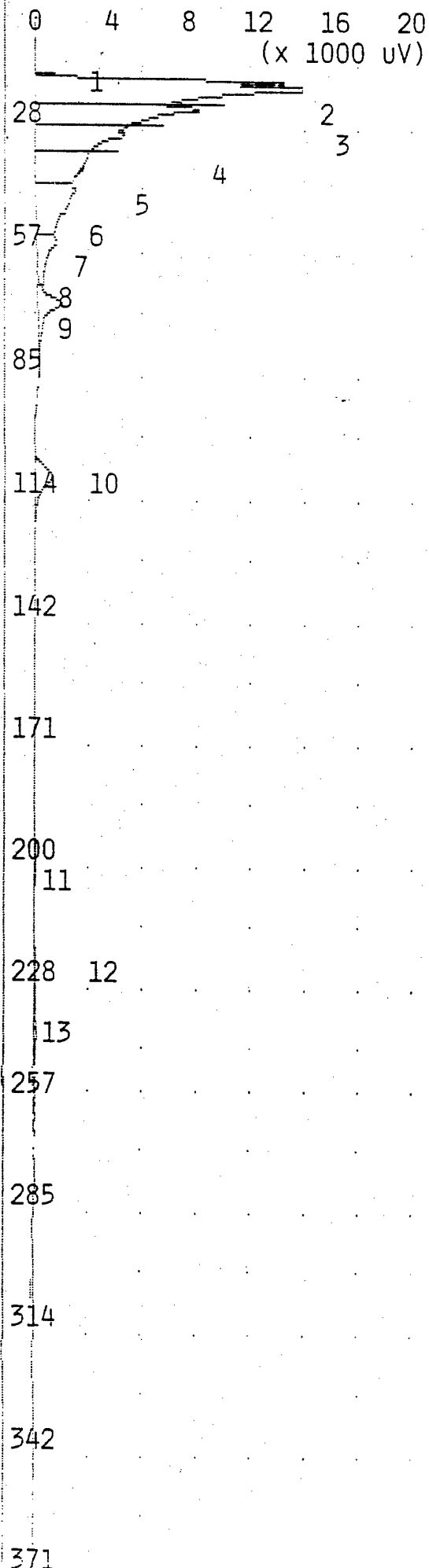
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.037 MVS	13.6
2	UNKNOWN	13.23 MVS	15.5
3	UNKNOWN	153.8 MVS	17.0
4	UNKNOWN	0.479 MVS	22.0
5	UNKNOWN	1.531 MVS	40.8
6	BENZENE	0.007 PPB	53.0
7	UNKNOWN	3.143 MVS	66.8
8	TOLUENE	4.295 PPB	107.2
9	UNKNOWN	1.512 MVS	198.8
10	ETHYLBENZENE	1.673 PPB	223.2
11	M,P-XYLENE	7.019 PPB	236.4
12	UNKNOWN	0.276 MVS	334.6

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-002MW  
 0.5- 2.5 10G

## ANALYTIC #16 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 11,95 10:49

SAMPLE TIME: MAY 11,95 10:42

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

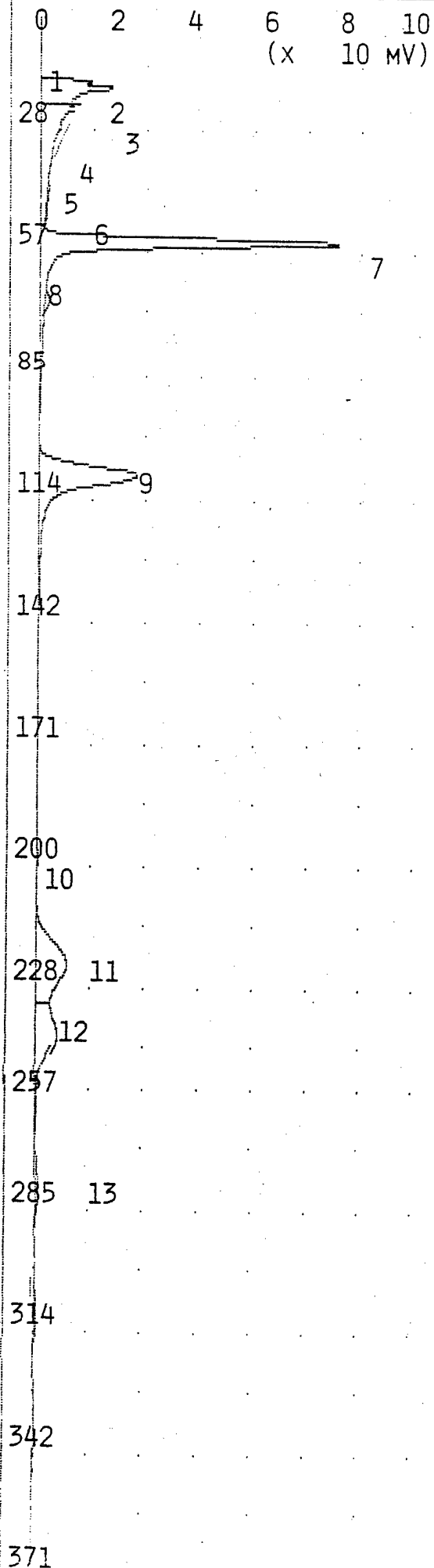
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	2.050 MVS	14.2
2	UNKNOWN	16.34 MVS	15.4
3	UNKNOWN	51.06 MVS	17.2
4	UNKNOWN	38.17 MVS	22.0
5	UNKNOWN	37.86 MVS	27.8
6	UNKNOWN	0.233 MVS	35.2
7	UNKNOWN	18.12 MVS	40.6
8	BENZENE	3.339 PPB	52.5
9	UNKNOWN	7.733 MVS	66.5
10	TOLUENE	4.013 PPB	106.6
11	UNKNOWN	1.393 MVS	196.4
12	ETHYLBENZENE	1.147 PPB	220.2
13	M,P-XYLENE	2.739 PPB	234.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-002MW  
5.0- 7.0 10s



## ANALYTIC #17 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 11,95 10:59

SAMPLE TIME: MAY 11,95 10:52

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

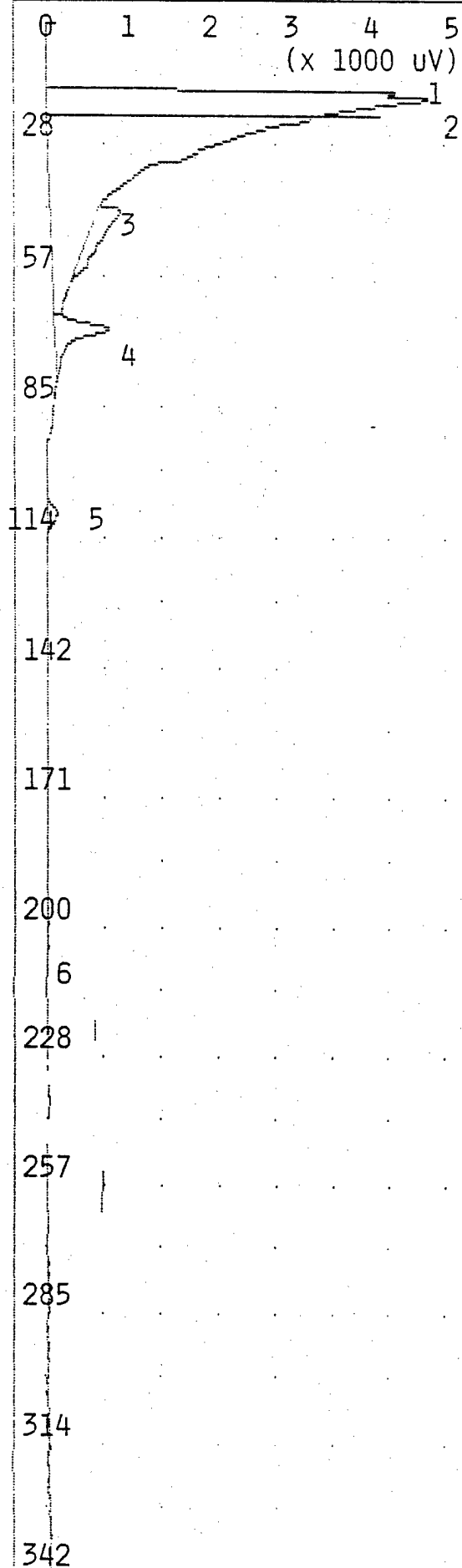
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.042 MVS	13.9
2	UNKNOWN	15.78 MVS	15.4
3	UNKNOWN	153.1 MVS	16.9
4	UNKNOWN	3.226 MVS	22.0
5	UNKNOWN	0.753 MVS	26.0
6	UNKNOWN	2.630 MVS	40.6
7	BENZENE	107.6 PPB	52.9
8	UNKNOWN	4.014 MVS	66.1
9	TOLUENE	103.7 PPB	106.5
10	UNKNOWN	1.214 MVS	195.4
11	ETHYLBENZENE	103.7 PPB	221.4
12	M,P-XYLENE	212.2 PPB	237.6
13	O-XYLENE	108.1 PPB	279.7

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

## ANALYSIS #18 1QS+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 11,95 12:33

SAMPLE TIME: MAY 11,95 12:26

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 14 ML/MIN

B/F FLOW 14 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 31 C

MAX GAIN 1000

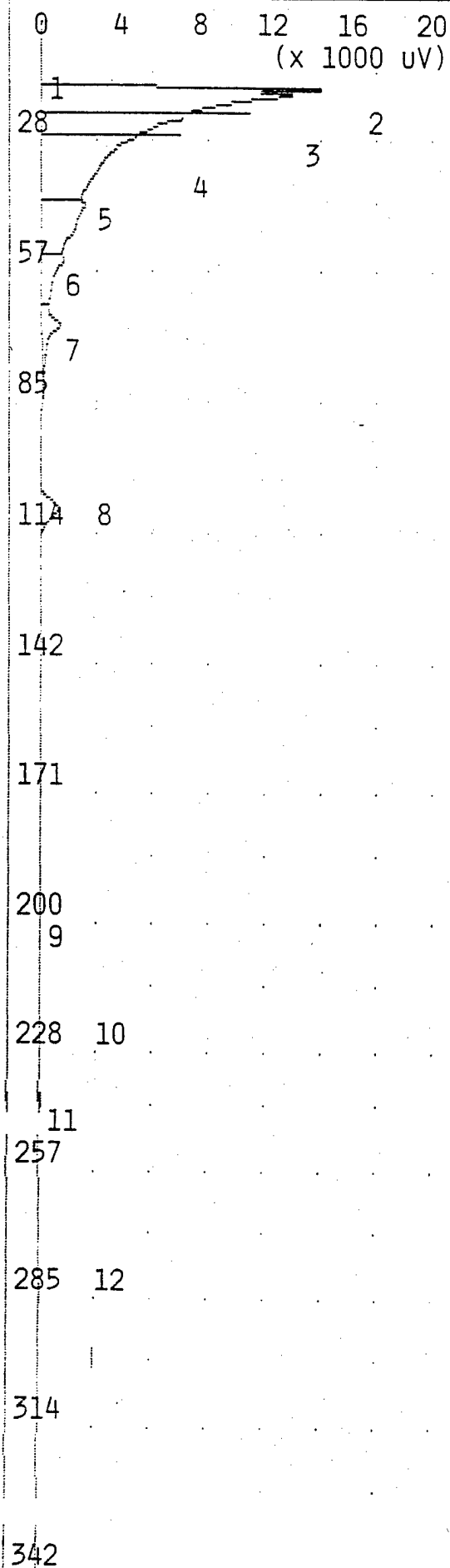
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	4.790 MVS	15.6
2	UNKNOWN	62.29 MVS	17.0
3	UNKNOWN	2.728 MVS	40.8
4	UNKNOWN	3.254 MVS	66.8
5	TOLUENE	0.924 PPB	107.3
6	ETHYLBENZENE	0.653 PPB	202.6

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK



TIME PRINTED: MAY 11,95 12:48

SAMPLE TIME: MAY 11,95 12:41

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

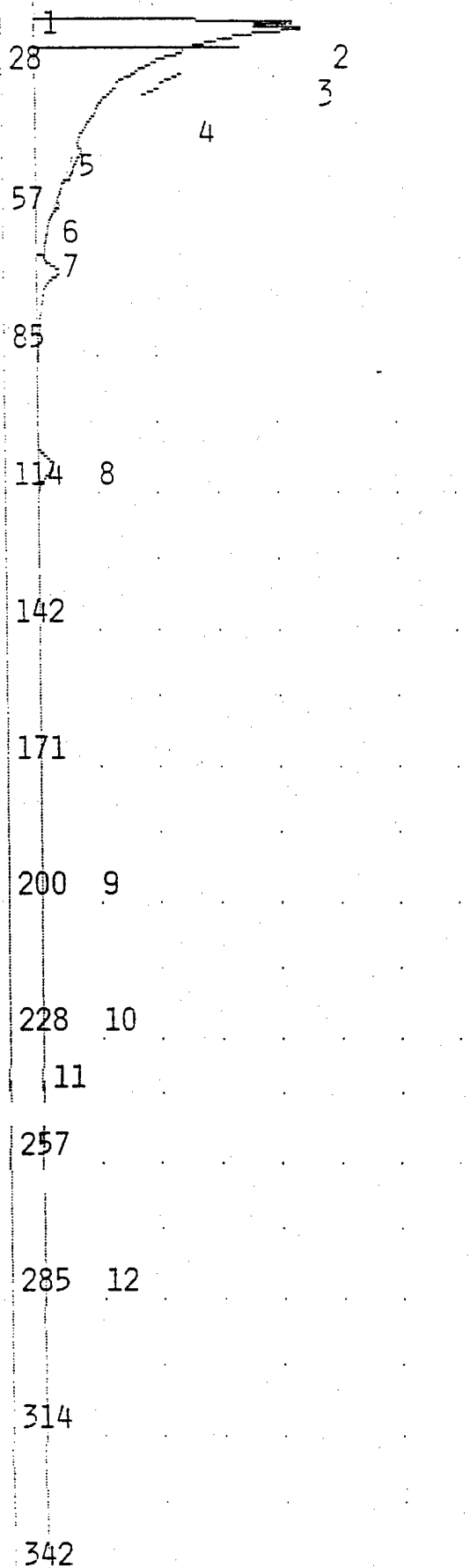
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.020 MVS	14.0
2	UNKNOWN	15.82 MVS	15.6
3	UNKNOWN	51.09 MVS	17.0
4	UNKNOWN	72.26 MVS	22.0
5	UNKNOWN	20.40 MVS	40.8
6	BENZENE	3.548 PPB	53.1
7	UNKNOWN	6.041 MVS	67.2
8	TOLUENE	4.294 PPB	107.2
9	UNKNOWN	1.462 MVS	200.4
10	ETHYLBENZENE	1.859 PPB	223.4
11	M,P-XYLENE	7.298 PPB	238.4
12	O-XYLENE	3.791 PPB	275.4

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-002MW  
 025-002MW  
 10.0-12.0 10G

0 4 8 12 16 20  
(x 1000 UV)



TIME PRINTED: MAY 11,95 12:59  
SAMPLE TIME: MAY 11,95 12:52

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.015 MVS	13.6
2	UNKNOWN	14.80 MVS	15.4
3	UNKNOWN	147.3 MVS	16.8
4	UNKNOWN	0.221 MVS	21.8
5	UNKNOWN	1.845 MVS	41.1
6	BENZENE	0.130 PPB	52.9
7	UNKNOWN	6.636 MVS	66.6
8	TOLUENE	3.593 PPB	106.9
9	UNKNOWN	1.148 MVS	194.4
10	ETHYLBENZENE	0.972 PPB	223.4
11	M,P-XYLENE	4.297 PPB	236.4
12	O-XYLENE	3.309 PPB	274.6

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-002MW  
15.0-17.0 10G

## ANALYSIS #21 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 10 MV)

TIME PRINTED: MAY 11,95 14:14

SAMPLE TIME: MAY 11,95 14:07

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

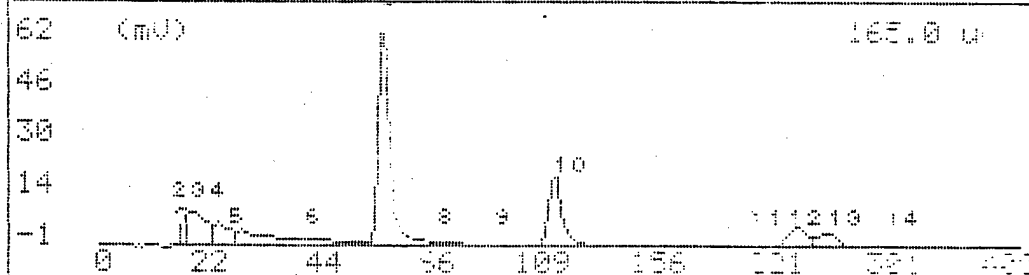
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.045 MVS	13.8
2	UNKNOWN	14.20 MVS	15.4
3	UNKNOWN	38.20 MVS	16.8
4	UNKNOWN	23.60 MVS	22.0
5	UNKNOWN	39.14 MVS	26.0
6	UNKNOWN	16.85 MVS	40.8
7	BENZENE	85.59 PPB	53.2
8	UNKNOWN	1.026 MVS	66.8
9	UNKNOWN	0.226 MVS	84.0
10	TOLUENE	85.32 PPB	107.3
11	UNKNOWN	0.833 MVS	198.0
12	ETHYLBENZENE	81.49 PPB	222.6
13	M,P-XYLENE	165.5 PPB	239.0
14	O-XYLENE	83.28 PPB	281.8

## NOTES

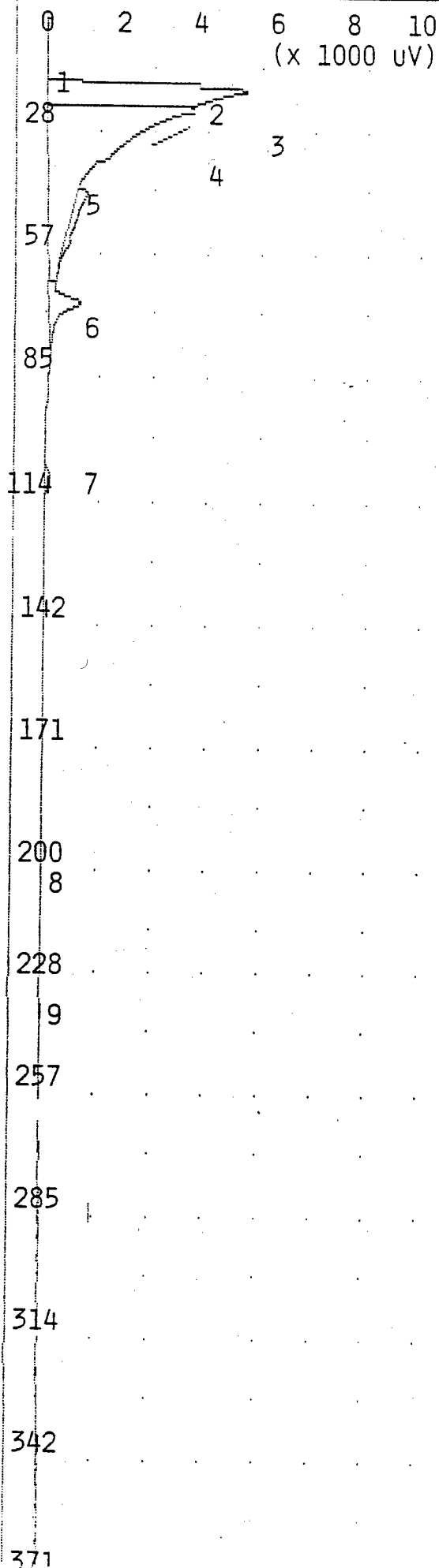
JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

G.C. Ready		10:14 GC Function		11:14:55	
-- Analysis No 21		-- Run at --		May 11 1995	
PK No	Name	Conc/Area	Flags	Ret. Time	
6	Unknown	16.85	mUS	-Ac-	16.85
7	benzene	100.0	ppb	-Ac-	16.85
8	Unknown	1.026	mUS	-Ac-	16.85
9	Unknown	0.226	mUS	-Ac-	16.85
10	toluene	100.0	ppb	-Ac-	16.85
11	Unknown	0.833	mUS	-Ac-	16.85
12	ethylbenzene	99.99	ppb	-Ac-	16.85
13	m,p-xylene	199.9	ppb	-Ac-	16.85
14	o-xylene	100.0	ppb	-Ac-	16.85
- Detected 14 peaks. Use + - to scroll. [ 405 sec.]					



## ANALYSIS #22

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 11,95 14:28

SAMPLE TIME: MAY 11,95 14:21

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

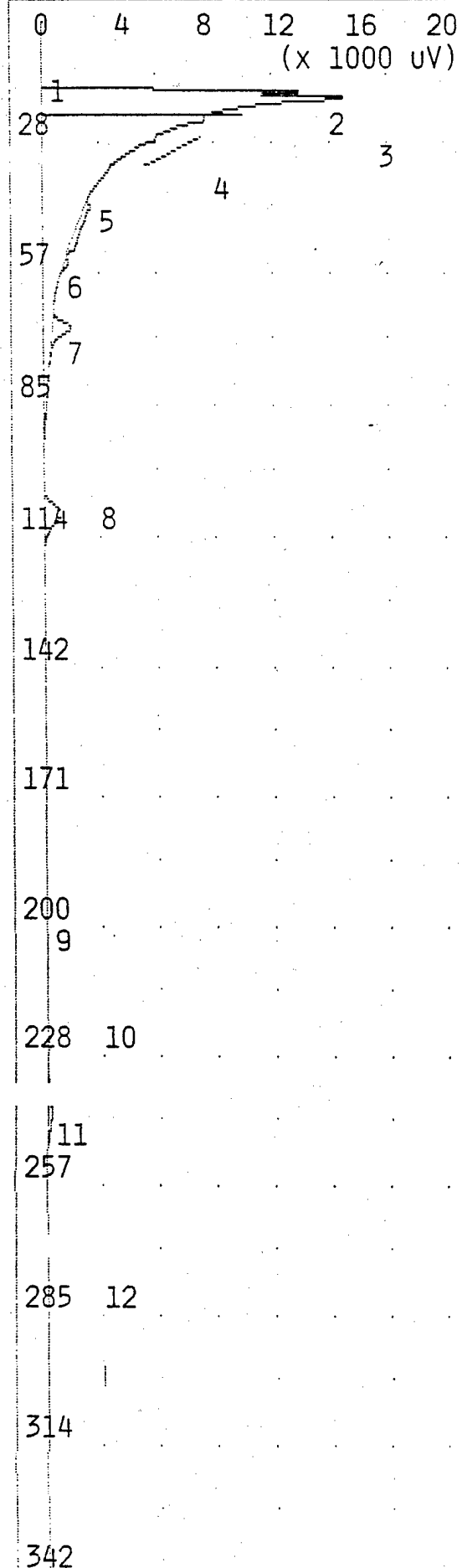
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.094 MVS	14.0
2	UNKNOWN	4.452 MVS	15.6
3	UNKNOWN	75.34 MVS	17.1
4	UNKNOWN	0.534 MVS	22.0
5	UNKNOWN	2.527 MVS	41.2
6	UNKNOWN	4.760 MVS	66.8
7	TOLUENE	1.151 PPB	106.6
8	UNKNOWN	13.58 MVS	196.8
9	M,P-XYLENE	27.29 PPB	237.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

## ANALYSIS #23 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 11,95 14:38

SAMPLE TIME: MAY 11,95 14:31

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.189 MVS	14.0
2	UNKNOWN	13.81 MVS	15.6
3	UNKNOWN	185.6 MVS	17.0
4	UNKNOWN	0.392 MVS	22.0
5	UNKNOWN	2.708 MVS	40.8
6	BENZENE	0.191 PPB	52.4
7	UNKNOWN	3.600 MVS	66.9
8	TOLUENE	4.826 PPB	107.3
9	UNKNOWN	1.442 MVS	198.4
10	ETHYLBENZENE	2.736 PPB	223.0
11	M,P-XYLENE	13.47 PPB	239.8
12	O-XYLENE	8.640 PPB	280.0

## NOTES

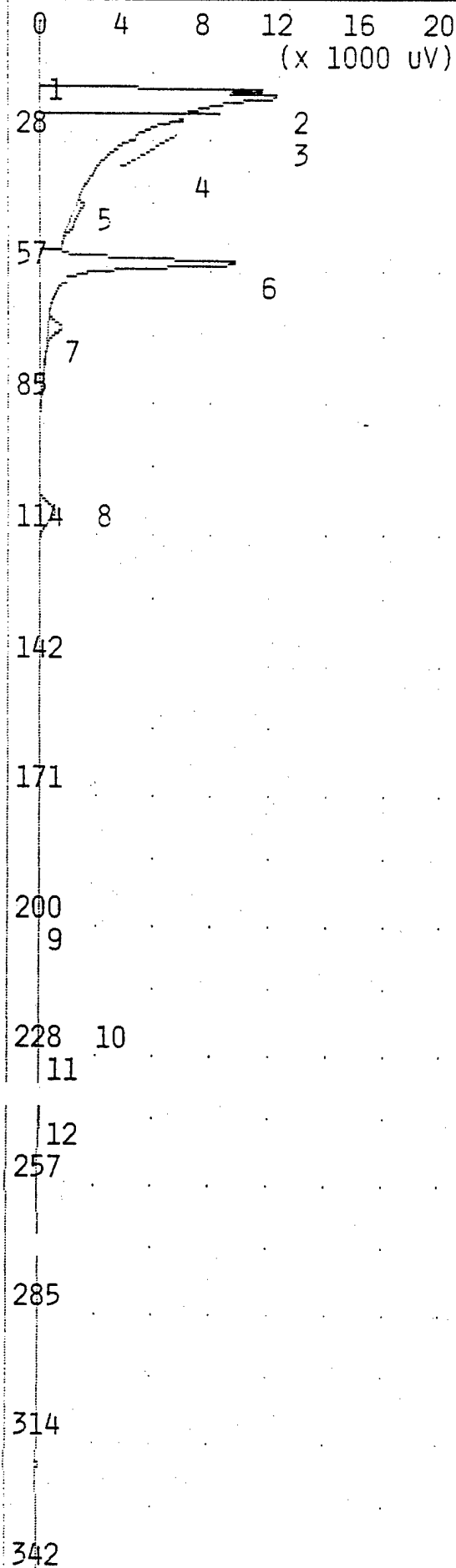
JOE BYRD, JR.

DULUTH ANGB

025-003MW

0.5- 2.5 10g





TIME PRINTED: MAY 11,95 14:48

SAMPLE TIME: MAY 11,95 14:41

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.048 MVS	13.8
2	UNKNOWN	12.86 MVS	15.6
3	UNKNOWN	137.7 MVS	17.0
4	UNKNOWN	0.534 MVS	22.2
5	UNKNOWN	1.728 MVS	40.8
6	BENZENE	25.07 PPB	53.4
7	UNKNOWN	1.511 MVS	66.9
8	TOLUENE	4.365 PPB	107.4
9	UNKNOWN	5.100 MVS	199.2
10	ETHYLBENZENE	2.137 PPB	221.2
11	UNKNOWN	2.585 MVS	225.4
12	M,P-XYLENE	15.13 PPB	239.2

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-003MW  
5.0- 7.0 10G

0 2 4 6 8 10  
(x 100 MV)

TIME PRINTED: MAY 11,95 14:58

SAMPLE TIME: MAY 11,95 14:51

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 14 ML/MIN

B/F FLOW 14 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 32 C

MAX GAIN 1000

ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	26.22 MVS	15.6
2	UNKNOWN	756.2 MVS	18.2
3	UNKNOWN	1.044 VSEC	22.4
4	UNKNOWN	1.398 VSEC	25.0
5	UNKNOWN	1.292 VSEC	26.3
6	UNKNOWN	296.1 MVS	31.2
7	UNKNOWN	545.5 MVS	33.5
8	UNKNOWN	304.5 MVS	37.4
9	UNKNOWN	671.1 MVS	42.0
10	UNKNOWN	146.1 MVS	44.7
11	UNKNOWN	597.3 MVS	46.9
12	BENZENE	773.7 PPB	53.5
13	UNKNOWN	18.20 MVS	73.0
14	UNKNOWN	10.26 MVS	78.4
15	UNKNOWN	2.362 MVS	83.3
16	UNKNOWN	5.419 MVS	92.8
17	TOLUENE	350.4 PPB	107.3
18	ETHYLBENZENE	297.4 PPB	222.6
19	M,P-XYLENE	1.838 PPM	239.2
20	O-XYLENE	827.1 PPB	280.8
21	UNKNOWN	50.55 MVS	328.8

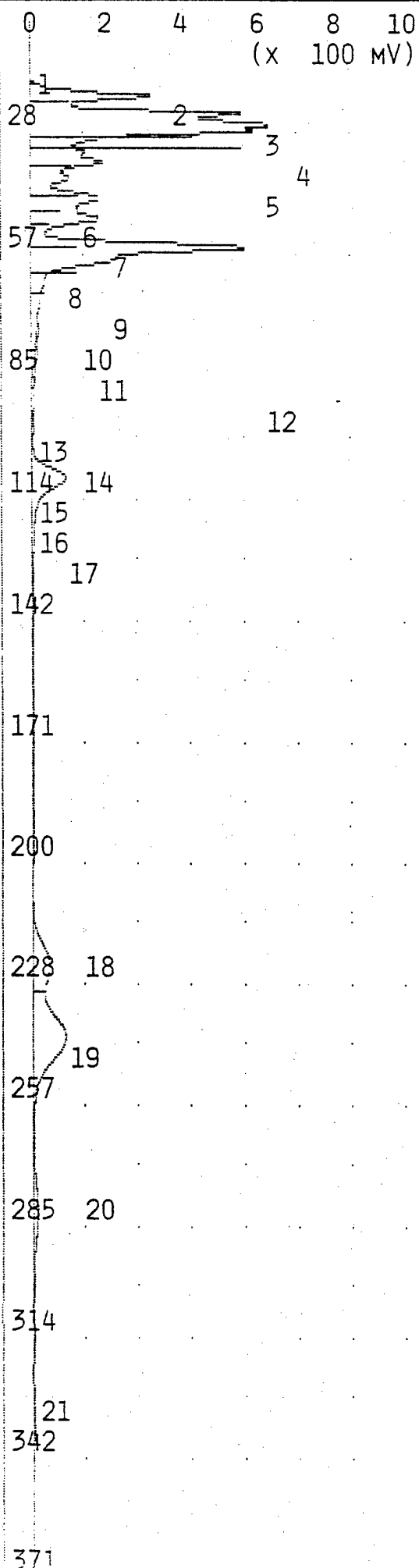
## NOTES

JOE BYRD, JR.

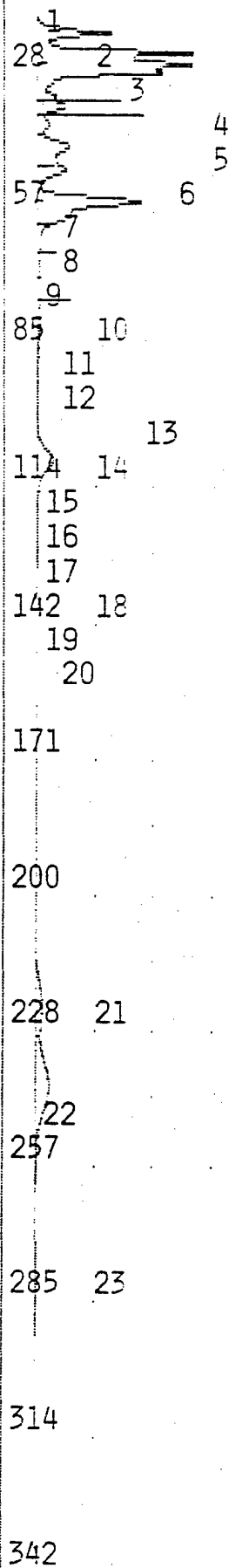
DULUTH ANGB

025-003MW

10.0-12.0 10G



0 1 2 3 4 5  
(X 100 MV)



TIME PRINTED: MAY 11,95 15:18

SAMPLE TIME: MAY 11,95 15:11

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

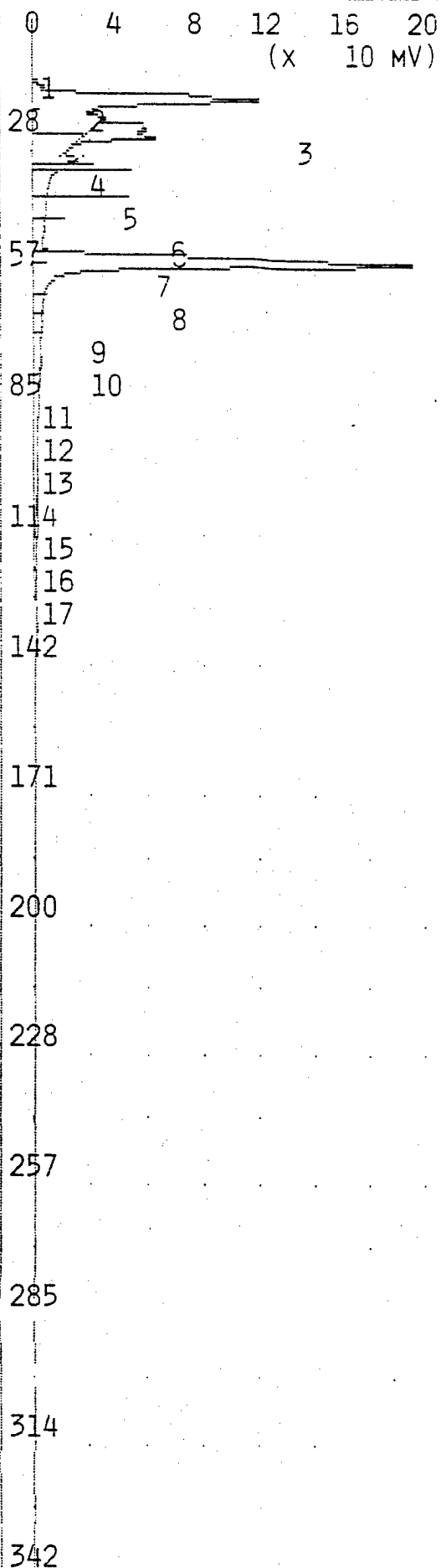
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.384 MVS	14.0
2	UNKNOWN	4.163 MVS	15.2
3	UNKNOWN	160.0 MVS	18.0
4	UNKNOWN	289.0 MVS	22.1
5	UNKNOWN	369.2 MVS	24.7
6	UNKNOWN	262.5 MVS	26.2
7	UNKNOWN	40.58 MVS	31.0
8	UNKNOWN	87.46 MVS	33.2
9	UNKNOWN	40.63 MVS	37.2
10	UNKNOWN	129.7 MVS	41.7
11	UNKNOWN	28.65 MVS	44.4
12	UNKNOWN	105.1 MVS	46.6
13	BENZENE	133.0 PPB	53.0
14	UNKNOWN	135.9 MVS	55.8
15	UNKNOWN	1.420 MVS	61.4
16	UNKNOWN	17.54 MVS	66.4
17	UNKNOWN	21.78 MVS	72.9
18	UNKNOWN	30.69 MVS	78.1
19	UNKNOWN	14.12 MVS	92.6
20	TOLUENE	103.3 PPB	106.6
21	ETHYLBENZENE	107.5 PPB	221.6
22	M,P-XYLENE	442.9 PPB	238.4
23	O-XYLENE	197.2 PPB	280.0

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-003MW RESHOT  
10.0-12.0 10G  
5X DILUTION  
20 MICROLITER INJECTION

## ANALYSIS #27 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 11,95 15:38

SAMPLE TIME: MAY 11,95 15:31

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 33 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	3.042 MVS	14.0
2	UNKNOWN	7.031 MVS	15.1
3	UNKNOWN	321.0 MVS	18.1
4	UNKNOWN	1.326 MVS	20.6
5	UNKNOWN	52.37 MVS	22.0
6	UNKNOWN	77.05 MVS	23.7
7	UNKNOWN	62.94 MVS	24.8
8	UNKNOWN	148.1 MVS	26.2
9	UNKNOWN	51.26 MVS	31.0
10	UNKNOWN	69.98 MVS	33.0
11	UNKNOWN	15.28 MVS	40.7
12	UNKNOWN	27.29 MVS	42.2
13	UNKNOWN	25.43 MVS	46.6
14	BENZENE	221.8 PPB	53.1
15	UNKNOWN	0.109 MVS	66.4
16	TOLUENE	13.57 PPB	106.5
17	UNKNOWN	10.33 MVS	120.0

## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-003MW

15.0-17.0 10G

10X DILUTION

10 MICROLITER INJECTION

0 2 4 6 8 10  
(x 100 MV)

TIME PRINTED: MAY 11,95 15:52

SAMPLE TIME: MAY 11,95 15:45

## METHOD

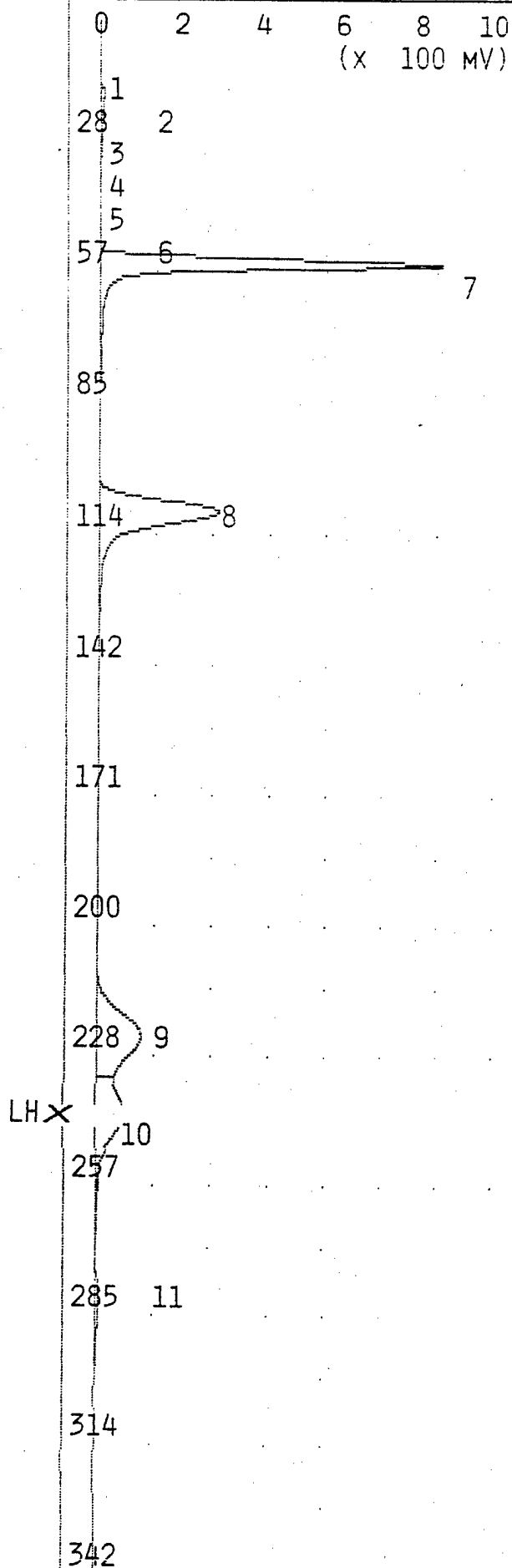
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 33 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

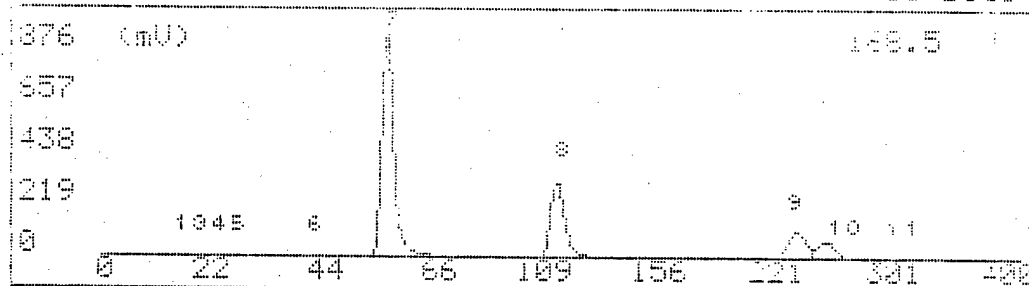
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.038 MVS	14.2
2	UNKNOWN	14.35 MVS	15.6
3	UNKNOWN	43.29 MVS	17.0
4	UNKNOWN	29.01 MVS	22.2
5	UNKNOWN	40.85 MVS	26.2
6	UNKNOWN	11.51 MVS	40.7
7	BENZENE	696.2 PPB	53.6
8	TOLUENE	679.1 PPB	107.4
9	ETHYLBENZENE	658.2 PPB	222.6
10	M,P-XYLENE	1.389 PPM	239.2
11	O-XYLENE	585.5 PPB	280.5

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
1 PPM BTEX STD

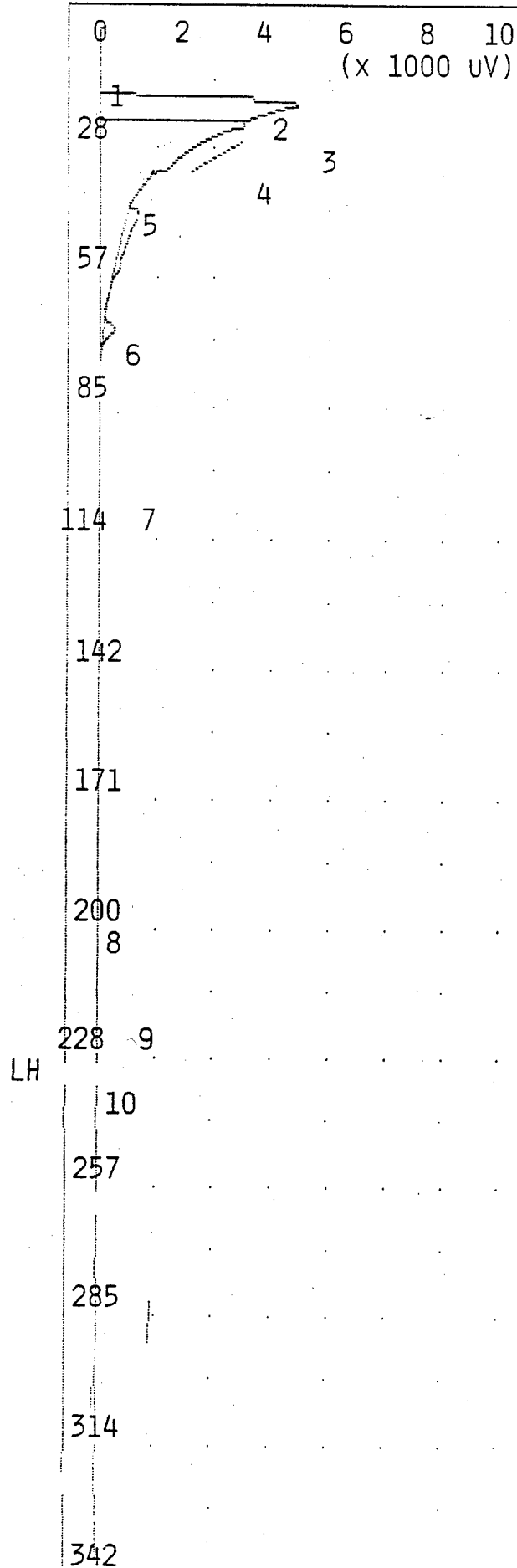


1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100



## ANALYSIS #29

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 11,95 16:07

SAMPLE TIME: MAY 11,95 16:01

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 33 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

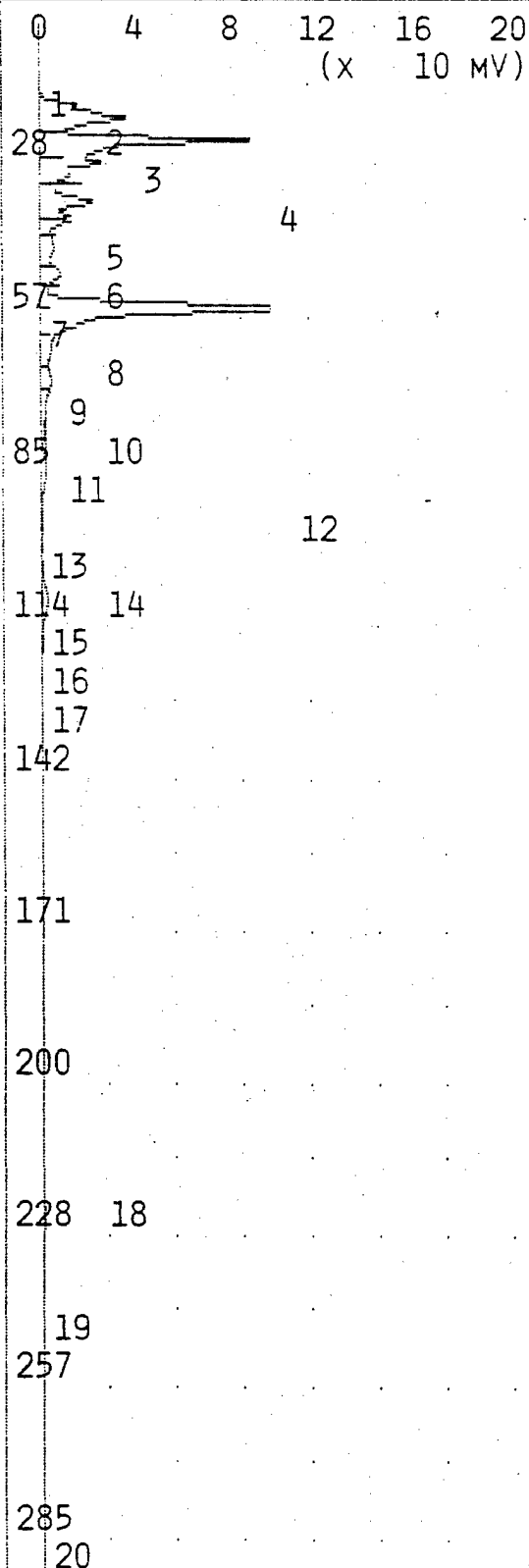
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.015 MVS	14.1
2	UNKNOWN	4.188 MVS	15.6
3	UNKNOWN	72.35 MVS	17.1
4	UNKNOWN	0.135 MVS	22.0
5	UNKNOWN	2.584 MVS	41.0
6	UNKNOWN	1.104 MVS	67.0
7	TOLUENE	1.287 PPB	107.2
8	UNKNOWN	0.831 MVS	201.4
9	ETHYLBENZENE	0.887 PPB	222.4
10	M;P-XYLENE	2.824 PPB	237.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB

~~1 PPM DTEX STD~~

AIR BLANK JB



TIME PRINTED: MAY 11,95 16:18

SAMPLE TIME: MAY 11,95 16:12

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 33 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	2.360 MVS	14.2
2	UNKNOWN	18.66 MVS	15.6
3	UNKNOWN	107.0 MVS	18.2
4	UNKNOWN	191.1 MVS	22.3
5	UNKNOWN	46.24 MVS	26.4
6	UNKNOWN	30.62 MVS	28.6
7	UNKNOWN	7.651 MVS	31.1
8	UNKNOWN	54.63 MVS	33.5
9	UNKNOWN	39.68 MVS	36.8
10	UNKNOWN	26.07 MVS	42.4
11	UNKNOWN	36.19 MVS	47.0
12	BENZENE	148.8 PPB	53.4
13	UNKNOWN	49.73 MVS	66.9
14	UNKNOWN	0.370 MVS	72.9
15	UNKNOWN	0.114 MVS	78.9
16	UNKNOWN	17.78 MVS	84.0
17	TOLUENE	14.79 PPB	107.4
18	ETHYLBENZENE	9.370 PPB	223.2
19	M,P-XYLENE	24.88 PPB	240.5
20	O-XYLENE	15.88 PPB	284.2

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-003MW  
 20.0-22.0 10G



0 2 4 6 8 10  
(x 1000 UV)

TIME PRINTED: MAY 11,95 16:34

SAMPLE TIME: MAY 11,95 16:27

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 33 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

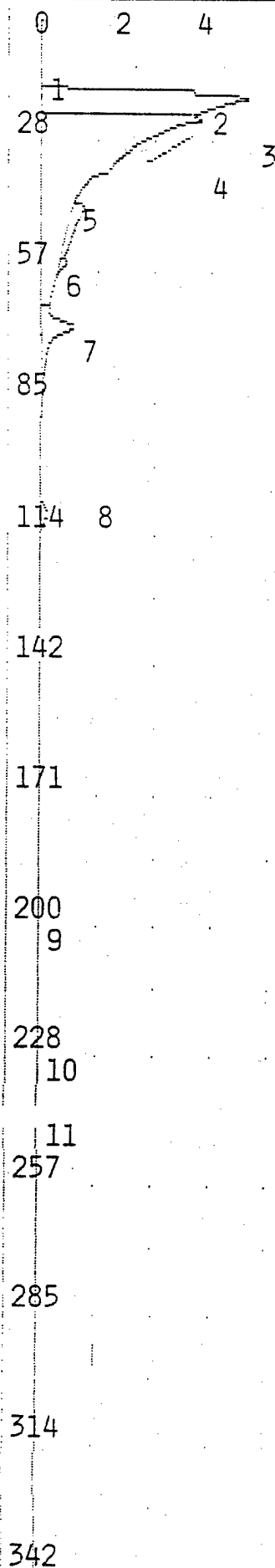
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.202 MVS	14.2
2	UNKNOWN	4.079 MVS	15.7
3	UNKNOWN	76.47 MVS	17.1
4	UNKNOWN	0.660 MVS	22.0
5	UNKNOWN	2.241 MVS	41.0
6	BENZENE	0.158 PPB	53.0
7	UNKNOWN	4.291 MVS	67.3
8	TOLUENE	1.298 PPB	107.6
9	UNKNOWN	0.789 MVS	200.8
10	ETHYLBENZENE	0.629 PPB	228.2
11	M,P-XYLENE	2.178 PPB	238.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

LH



0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 13,95 08:55

SAMPLE TIME: MAY 13,95 08:48

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 27 C  
MAX GAIN 1000

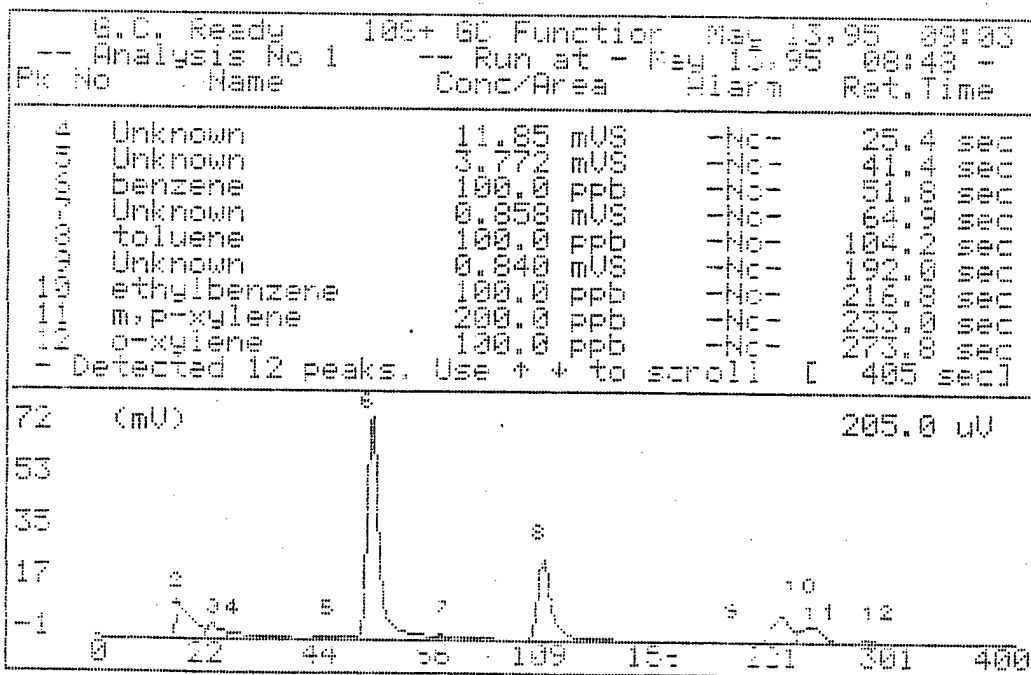
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.050 MVS	13.4
2	UNKNOWN	38.52 MVS	15.2
3	UNKNOWN	14.16 MVS	21.4
4	UNKNOWN	11.85 MVS	25.4
5	UNKNOWN	3.772 MVS	41.4
6	UNKNOWN	212.0 MVS	51.8
7	UNKNOWN	0.858 MVS	64.9
8	UNKNOWN	162.2 MVS	104.2
9	UNKNOWN	0.840 MVS	192.0
10	UNKNOWN	106.4 MVS	216.8
11	UNKNOWN	78.16 MVS	233.0
12	UNKNOWN	16.18 MVS	273.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX



## ANALYSIS #2 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 100 MV)TIME PRINTED: MAY 13,95 09:11  
SAMPLE TIME: MAY 13,95 09:04

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 28 C  
MAX GAIN 1000

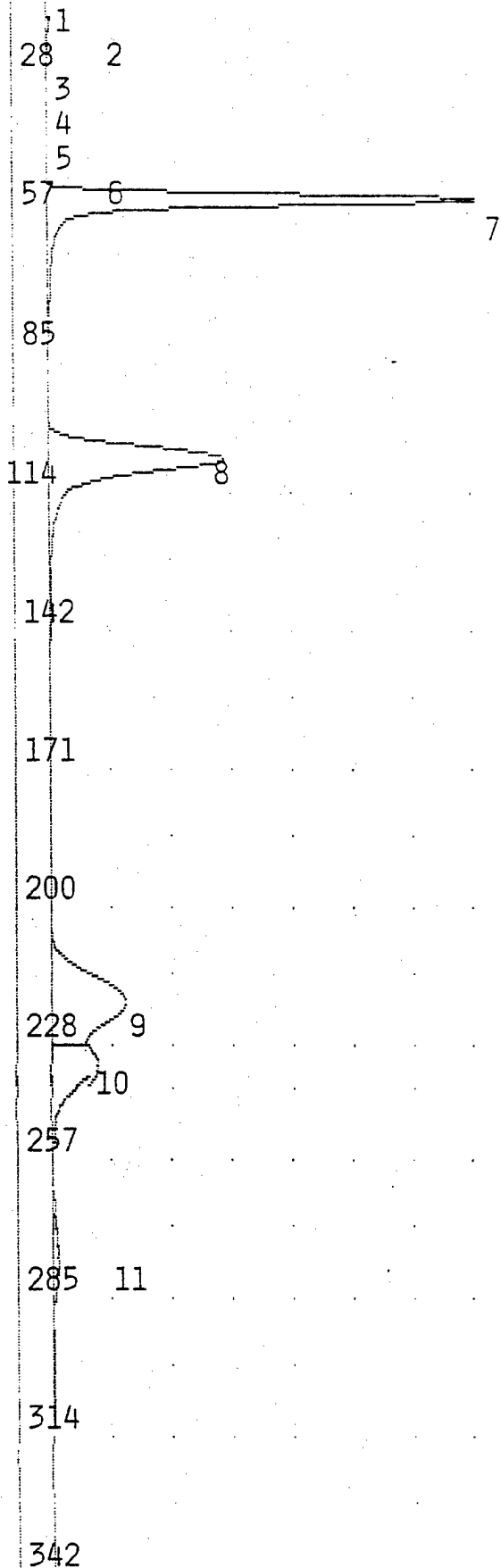
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

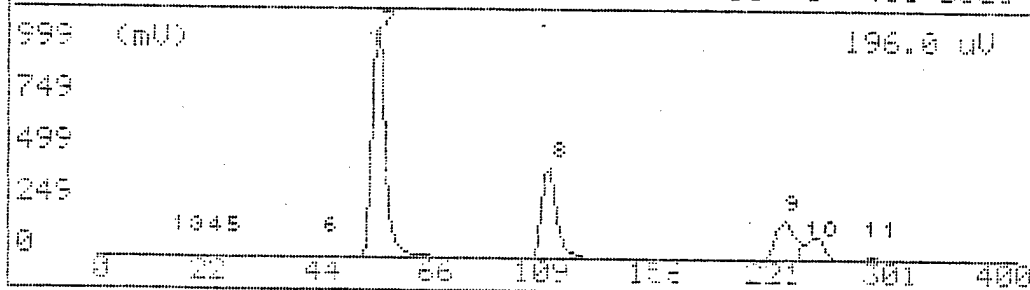
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.038 MVS	13.4
2	UNKNOWN	13.15 MVS	15.2
3	UNKNOWN	31.12 MVS	16.6
4	UNKNOWN	18.11 MVS	21.6
5	UNKNOWN	15.68 MVS	25.6
6	UNKNOWN	2.735 MVS	41.4
7	BENZENE	1.639 PPM	52.5
8	TOLUENE	1.852 PPM	105.4
9	ETHYLBENZENE	2.147 PPM	217.6
10	M,P-XYLENE	3.827 PPM	233.8
11	O-XYLENE	2.327 PPM	274.1

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
1 PPM BTEX



S.C. Ready .08+ GC Function May 13, 95 10:16  
 -- Analysis No 2 -- Run at -- May 13, 95 09:04 --  
 Pk No Name Conc/Area Alarm Ret. Time  
 1 Unknown 31.13 mUS -No- 16.6 sec  
 2 Unknown 18.11 mUS -No- 21.0 sec  
 3 Unknown 15.72 mUS -No- 25.0 sec  
 4 Unknown 2.774 mUS -No- 41.1 sec  
 5 benzene 1.000 ppm -No- 52.0 sec  
 6 toluene 1.000 ppm -No- 105.4 sec  
 7 ethylbenzene 1.000 ppm -No- 217.3 sec  
 8 m,p-xylene 2.000 ppm -No- 233.0 sec  
 9 o-xylene 1.000 ppm -No- 274.1 sec  
 - Detected 11 peaks. Use + - to scroll [ 405 sec]



## ANALYSIS #3

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 100 MV)

TIME PRINTED: MAY 13,95 09:24

SAMPLE TIME: MAY 13,95 09:18

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MV/SEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 14 ML/MIN

B/F FLOW 14 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 28 C

MAX GAIN 1000

ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.054 MVS	13.8
2	UNKNOWN	10.38 MVS	15.2
3	UNKNOWN	55.30 MVS	16.8
4	UNKNOWN	30.16 MVS	21.8
5	UNKNOWN	31.95 MVS	25.7
6	UNKNOWN	1.252 MVS	39.4
7	UNKNOWN	2.252 MVS	40.6
8	UNKNOWN	0.157 MVS	45.6
9	BENZENE	4.828 PPM	53.2
10	TOLUENE	6.827 PPM	106.2
11	UNKNOWN	17.78 MVS	187.8
12	ETHYLBENZENE	8.992 PPM	218.8
13	M,P-XYLENE	16.59 PPM	234.4
14	O-XYLENE	6.053 PPM	274.9

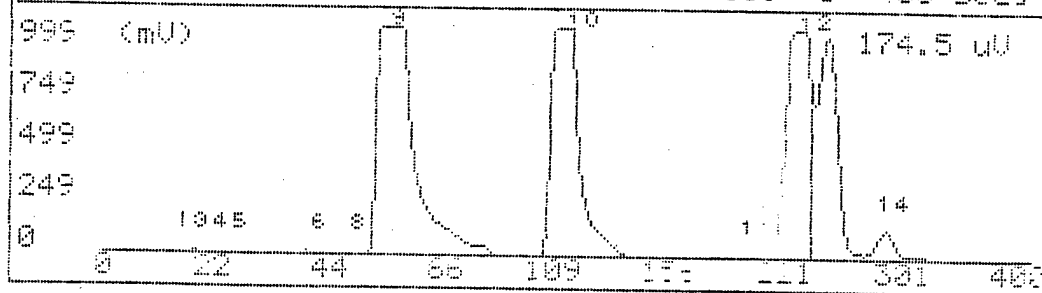
## NOTES

JOE BYRD, JR.

DULUTH ANGB

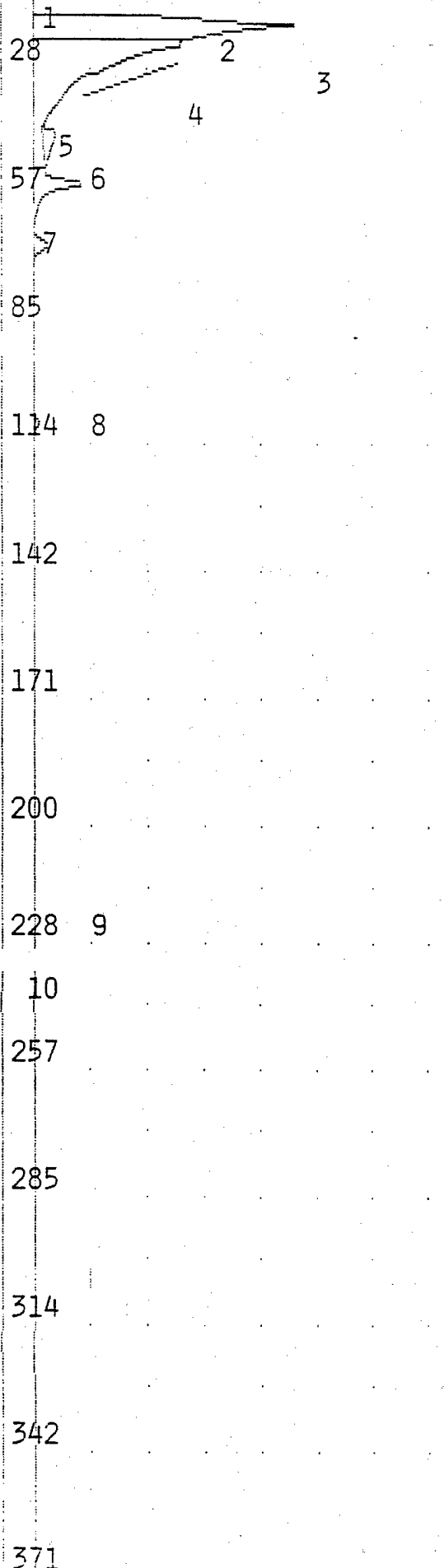
10 PPM BTEX

E.C. Ready		108+ GC Function	13.95	09:20
-- Analysis No 3		-- Run at	13.95	09:18
Pk No	Name	Conc/Area	Area	Ret. Time
1	Unknown	1.252 mUS	-No-	39.4 sec
2	Unknown	2.252 mUS	-No-	45.6 sec
3	Unknown	0.157 mUS	-No-	45.6 sec
4	benzene	10.00 ppm	-No-	50.2 sec
10	toluene	10.00 ppm	-No-	106.2 sec
11	Unknown	17.78 mUS	-No-	187.0 sec
12	ethylbenzene	10.00 ppm	-No-	218.0 sec
13	m,p-xylene	20.00 ppm	-No-	234.4 sec
14	o-xylene	10.01 ppm	-No-	274.0 sec
- Detected 14 peaks. Use ++ to scroll. [ 405 sec]				



## ANALYSIS #4

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 1000 UV)

TIME PRINTED: MAY 13,95 09:38

SAMPLE TIME: MAY 13,95 09:31

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 28 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

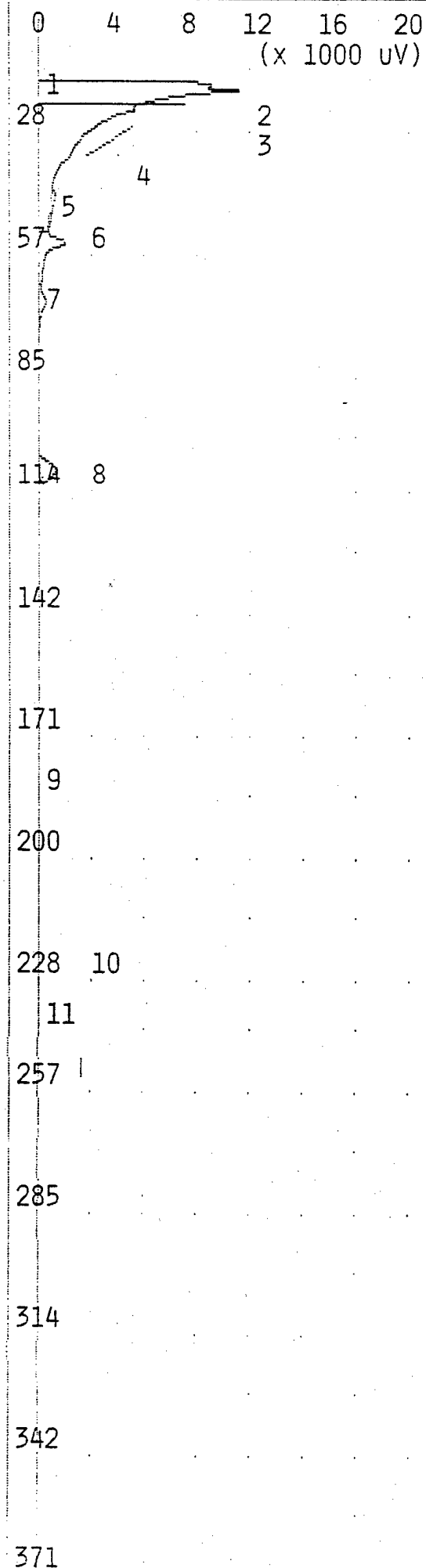
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.082 MVS	13.5
2	UNKNOWN	4.908 MVS	15.4
3	UNKNOWN	64.84 MVS	16.8
4	UNKNOWN	0.384 MVS	21.5
5	UNKNOWN	1.583 MVS	41.5
6	BENZENE	4.368 PPB	52.1
7	UNKNOWN	5.403 MVS	65.6
8	TOLUENE	2.513 PPB	105.7
9	ETHYLBENZENE	7.607 PPB	218.4
10	M,P-XYLENE	14.32 PPB	233.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK





TIME PRINTED: MAY 13,95 09:48

SAMPLE TIME: MAY 13,95 09:41

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.031 MVS	13.6
2	UNKNOWN	11.75 MVS	15.3
3	UNKNOWN	94.62 MVS	16.7
4	UNKNOWN	0.457 MVS	21.6
5	UNKNOWN	1.048 MVS	41.0
6	BENZENE	3.724 PPB	52.2
7	UNKNOWN	3.857 MVS	66.1
8	TOLUENE	4.311 PPB	105.7
9	UNKNOWN	3.199 MVS	177.6
10	ETHYLBENZENE	4.346 PPB	218.8
11	M,P-XYLENE	9.210 PPB	233.4

## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-009BH

0.5- 2.5 10G

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 13,95 09:59

SAMPLE TIME: MAY 13,95 09:52

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.570 MVS	13.9
2	UNKNOWN	12.84 MVS	15.2
3	UNKNOWN	39.49 MVS	16.8
4	UNKNOWN	50.78 MVS	21.7
5	UNKNOWN	10.41 MVS	41.0
6	BENZENE	3.098 PPB	52.6
7	UNKNOWN	4.202 MVS	66.2
8	TOLUENE	3.969 PPB	105.6
9	UNKNOWN	0.294 MVS	124.2
10	UNKNOWN	0.474 MVS	180.2
11	UNKNOWN	3.136 MVS	198.4
12	ETHYLBENZENE	3.380 PPB	218.8
13	M,P-XYLENE	2.321 PPB	234.6
14	UNKNOWN	1.483 MVS	237.6

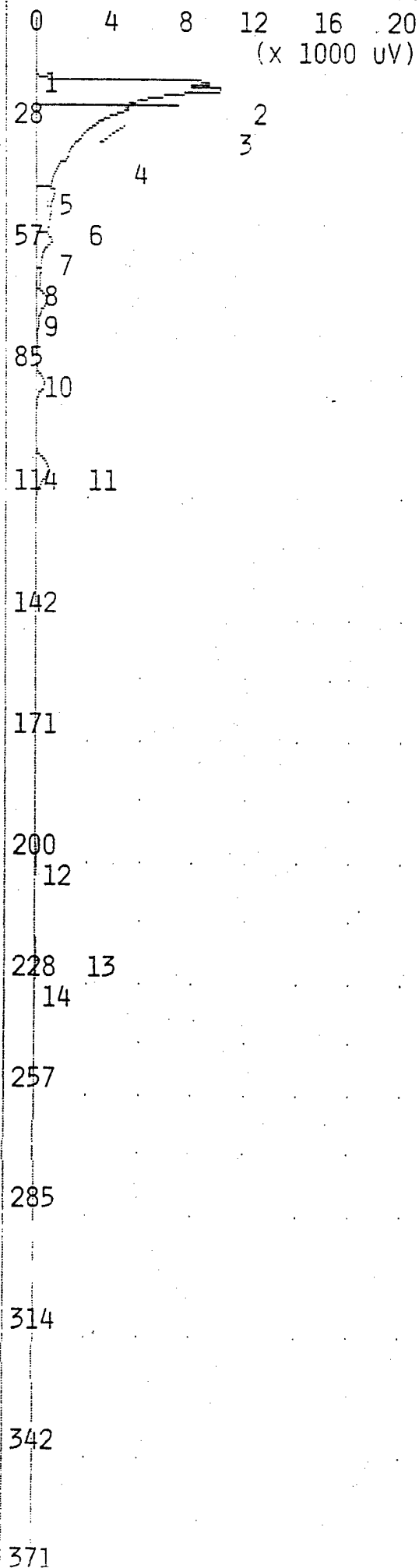
## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-009BH

5.0- 7.0 10G



TIME PRINTED: MAY 13,95 10:09

SAMPLE TIME: MAY 13,95 10:03

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 29 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

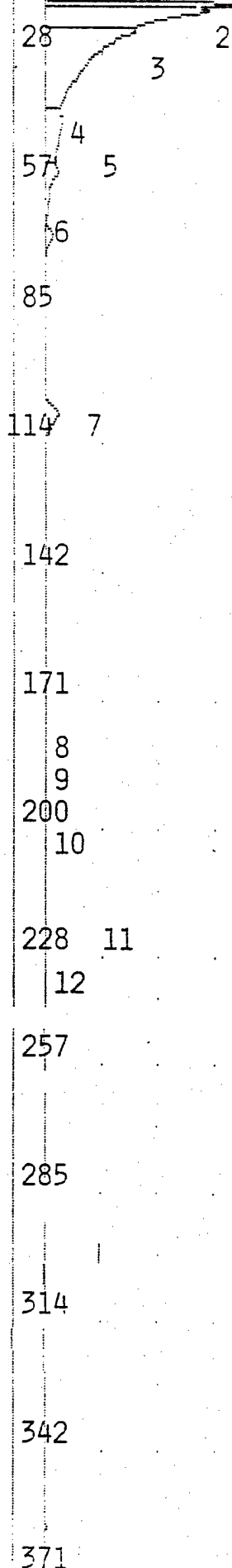
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.048 MVS	11.0
2	UNKNOWN	13.11 MVS	15.2
3	UNKNOWN	83.85 MVS	17.2
4	UNKNOWN	0.924 MVS	21.8
5	UNKNOWN	0.015 MVS	39.2
6	UNKNOWN	10.31 MVS	40.8
7	BENZENE	2.510 PPB	52.5
8	UNKNOWN	1.613 MVS	59.2
9	UNKNOWN	5.620 MVS	66.4
10	UNKNOWN	3.196 MVS	85.6
11	TOLUENE	3.173 PPB	105.7
12	UNKNOWN	2.049 MVS	197.4
13	ETHYLBENZENE	0.102 PPB	216.8
14	UNKNOWN	0.890 MVS	222.6

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-009BH  
 10.0-12.0 10G

0 4 8 12 16 20  
(x 1000 UV)



TIME PRINTED: MAY 13,95 10:20

SAMPLE TIME: MAY 13,95 10:13

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000

ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	13.55 MVS	15.4
2	UNKNOWN	32.71 MVS	16.8
3	UNKNOWN	40.86 MVS	21.9
4	UNKNOWN	10.27 MVS	40.8
5	BENZENE	2.234 PPB	52.2
6	UNKNOWN	2.847 MVS	66.4
7	TOLUENE	3.209 PPB	106.1
8	UNKNOWN	0.121 MVS	177.0
9	UNKNOWN	0.113 MVS	183.6
10	UNKNOWN	1.343 MVS	196.0
11	ETHYLBENZENE	1.352 PPB	222.6
12	M,P-XYLENE	4.279 PPB	236.6

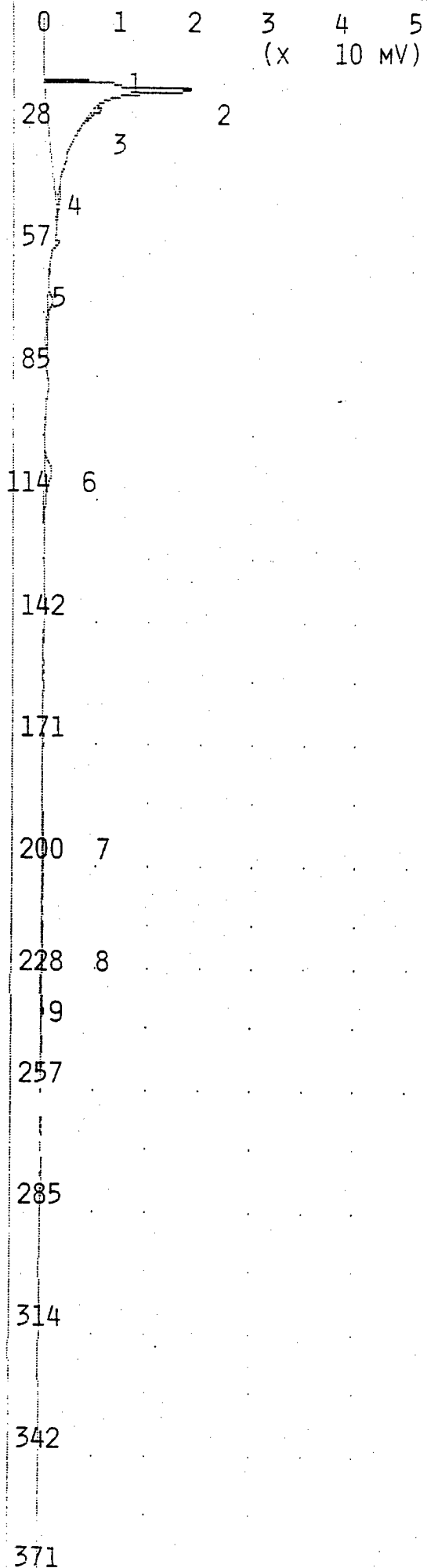
## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-011BH

0.5- 2.5 10G



TIME PRINTED: MAY 13,95 10:30

SAMPLE TIME: MAY 13,95 10:23

## METHOD

SLOPE UP 1.000 MV/SEC  
SLOPE DOWN 3.000 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	9.868 MVS	15.4
2	UNKNOWN	121.7 MVS	16.9
3	UNKNOWN	1.529 MVS	21.9
4	UNKNOWN	0.973 MVS	41.0
5	UNKNOWN	2.854 MVS	66.4
6	TOLUENE	3.718 PPB	106.2
7	UNKNOWN	1.185 MVS	194.8
8	ETHYLBENZENE	2.205 PPB	221.2
9	M,P-XYLENE	5.703 PPB	238.0

## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-011BH

5.0- 7.0 10G

0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 13,95 10:40

SAMPLE TIME: MAY 13,95 10:33

## METHOD

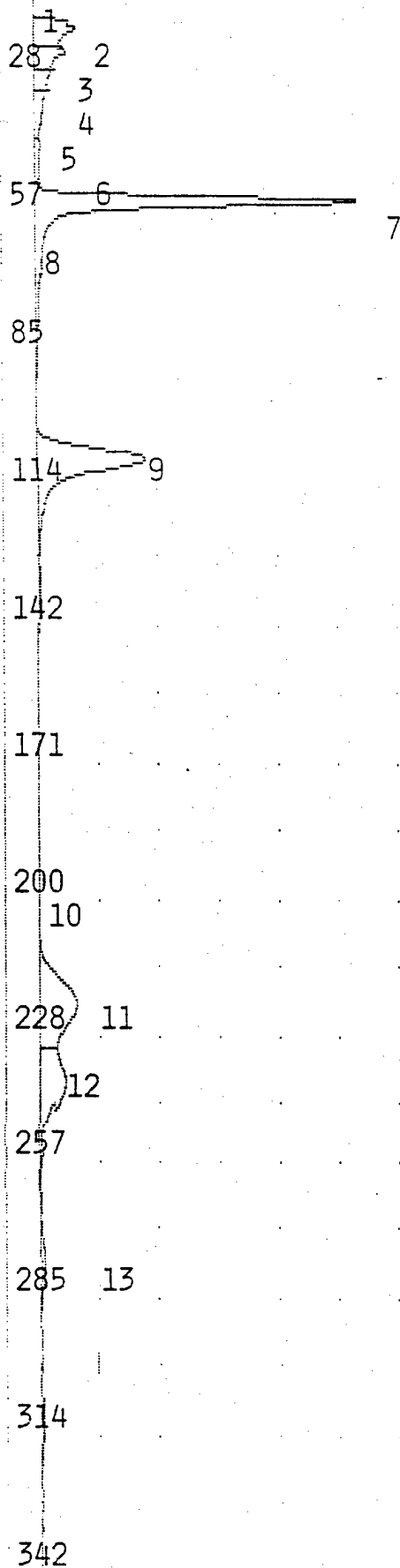
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

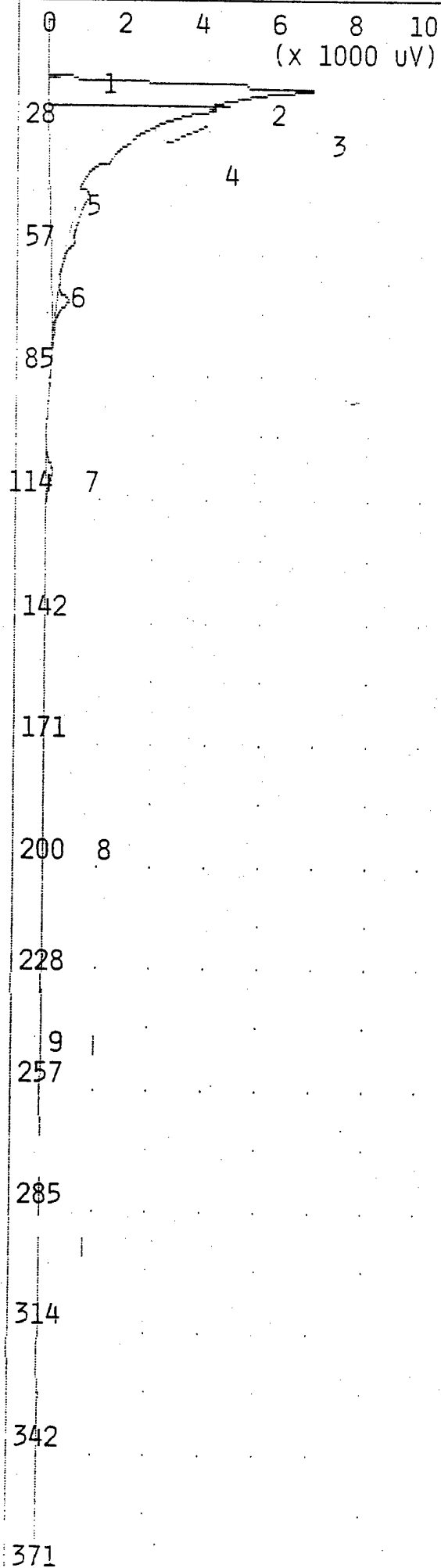
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.037 MVS	13.6
2	UNKNOWN	9.026 MVS	15.4
3	UNKNOWN	36.52 MVS	16.9
4	UNKNOWN	25.22 MVS	22.0
5	UNKNOWN	35.84 MVS	26.0
6	UNKNOWN	10.47 MVS	40.8
7	BENZENE	105.9 PPB	52.7
8	UNKNOWN	1.140 MVS	65.7
9	TOLUENE	100.4 PPB	106.1
10	UNKNOWN	0.797 MVS	195.6
11	ETHYLBENZENE	101.4 PPB	220.0
12	M,P-XYLENE	206.9 PPB	236.2
13	O-XYLENE	99.11 PPB	277.0

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX





TIME PRINTED: MAY 13, 95 10:50

SAMPLE TIME: MAY 13, 95 10:43

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 M/SEC  
MIN HEIGHT 0.000 M/  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	1.070 MVS	14.2
2	UNKNOWN	5.542 MVS	15.5
3	UNKNOWN	85.71 MVS	16.8
4	UNKNOWN	0.629 MVS	21.8
5	UNKNOWN	2.354 MVS	41.0
6	UNKNOWN	1.092 MVS	66.2
7	TOLUENE	0.753 PPB	106.4
8	UNKNOWN	0.597 MVS	193.8
9	M, P-XYLENE	3.468 PPB	238.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 13,95 11:00

SAMPLE TIME: MAY 13,95 10:54

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	10.91 MVS	15.4
2	UNKNOWN	108.4 MVS	16.8
3	UNKNOWN	0.369 MVS	21.8
4	UNKNOWN	1.166 MVS	40.8
5	BENZENE	0.216 PPB	52.5
6	TOLUENE	2.543 PPB	106.2
7	UNKNOWN	0.790 MVS	195.4
8	ETHYLBENZENE	1.204 PPB	220.6
9	M,P-XYLENE	2.719 PPB	236.4

## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-008BH

0.5- 2.5 10G



0 1 2 3 4 5  
(x 100 MV)

TIME PRINTED: MAY 13,95 11:10

SAMPLE TIME: MAY 13,95 11:04

## METHOD

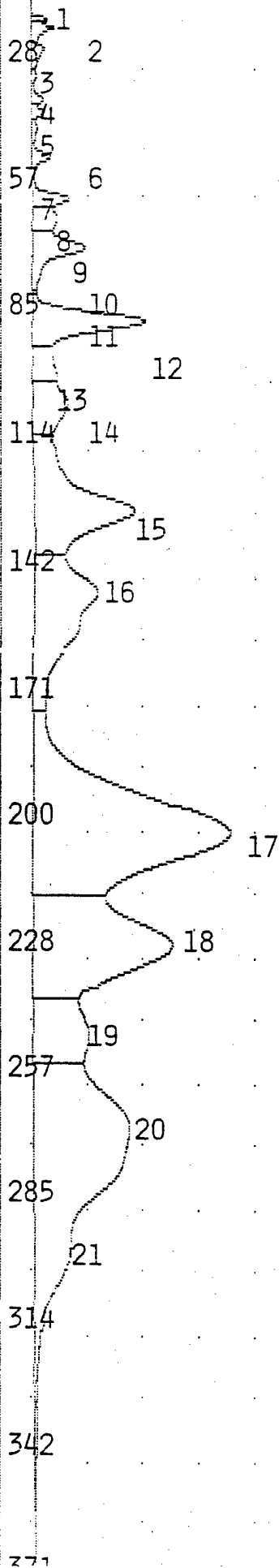
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	29.13 MVS	15.4
2	UNKNOWN	75.27 MVS	17.4
3	UNKNOWN	64.53 MVS	22.1
4	UNKNOWN	17.10 MVS	28.0
5	UNKNOWN	41.53 MVS	33.4
6	UNKNOWN	36.00 MVS	36.4
7	UNKNOWN	28.57 MVS	40.2
8	UNKNOWN	72.05 MVS	46.4
9	BENZENE	72.22 PPB	55.8
10	UNKNOWN	146.3 MVS	60.4
11	UNKNOWN	379.0 MVS	66.9
12	UNKNOWN	781.9 MVS	83.6
13	UNKNOWN	212.3 MVS	96.2
14	TOLUENE	183.9 PPB	102.0
15	UNKNOWN	1.647 VSEC	125.7
16	UNKNOWN	1.545 VSEC	144.2
17	UNKNOWN	5.131 VSEC	198.0
18	ETHYLBENZENE	1.274 PPM	223.4
19	M,P-XYLENE	1.291 PPM	244.0
20	O-XYLENE	18.92 PPM	265.0
21	UNKNOWN	1.441 MVS	291.4

## NOTES

JOE BYRD, JR  
DULUTH ANGB  
025-008BH  
7.0- 9.0 20G



0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 13,95 11:28

SAMPLE TIME: MAY 13,95 11:21

## METHOD

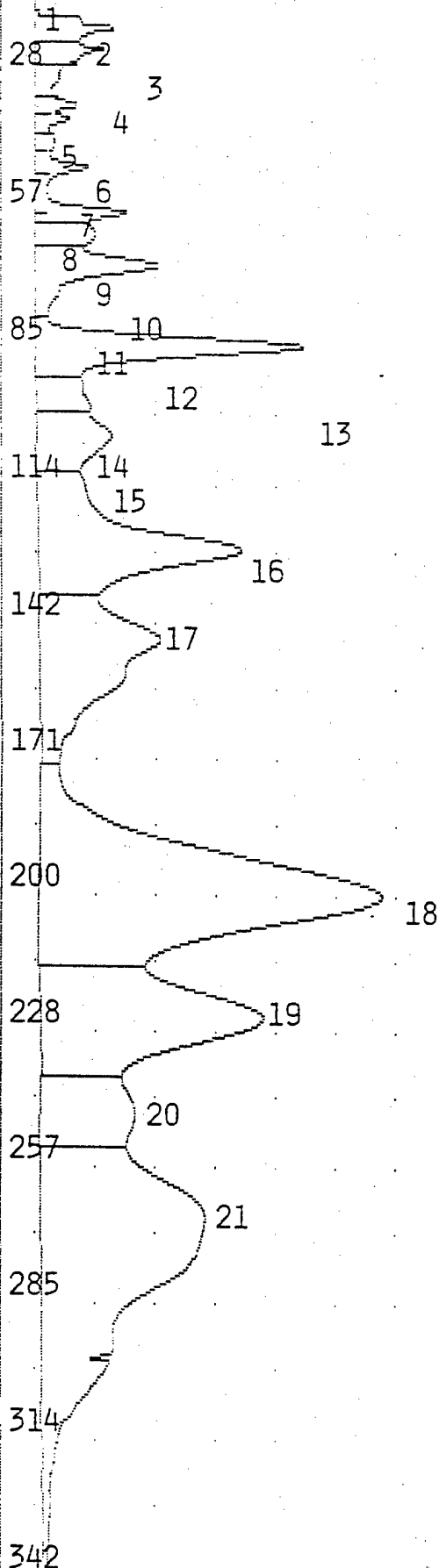
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

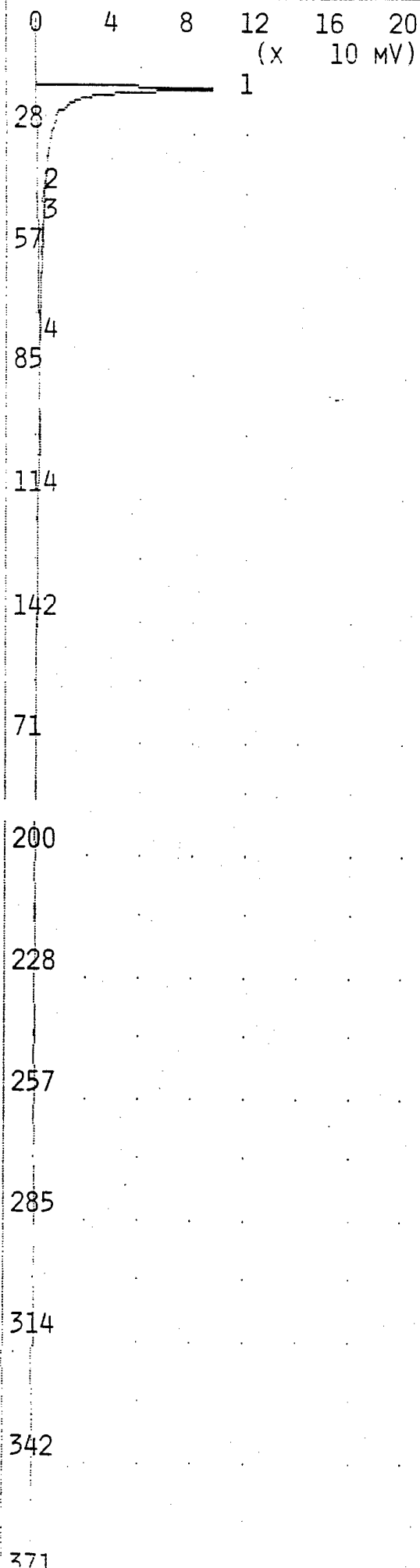
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.322 MVS	14.0
2	UNKNOWN	3.064 MVS	14.9
3	UNKNOWN	13.60 MVS	17.2
4	UNKNOWN	13.18 MVS	21.6
5	UNKNOWN	3.867 MVS	27.6
6	UNKNOWN	6.124 MVS	32.9
7	UNKNOWN	4.646 MVS	36.0
8	UNKNOWN	4.462 MVS	40.6
9	UNKNOWN	9.834 MVS	46.2
10	BENZENE	7.096 PPB	55.6
11	UNKNOWN	13.83 MVS	59.5
12	UNKNOWN	34.50 MVS	66.5
13	UNKNOWN	67.10 MVS	83.3
14	UNKNOWN	17.99 MVS	95.6
15	TOLUENE	21.83 PPB	101.8
16	UNKNOWN	118.9 MVS	125.6
17	UNKNOWN	112.7 MVS	143.8
18	UNKNOWN	324.6 MVS	198.2
19	ETHYLBENZENE	126.4 PPB	223.6
20	M,P-XYLENE	157.6 PPB	244.0
21	O-XYLENE	805.7 PPB	266.1

## NOTES

JOE BYRD, JR  
DULUTH ANGB  
025-008BH RESHOT  
7.0- 9.0 20G  
10 MICROLITER INJECTION





TIME PRINTED: MAY 13,95 11:43

SAMPLE TIME: MAY 13,95 11:36

## METHOD

SLOPE UP	0.500	MV/SEC
SLOPE DOWN	1.500	MV/SEC
MIN AREA	0.000	MVSEC
MIN HEIGHT	0.000	MV
ANALYSIS DELAY	0.0	SEC
WINDOW PERCENT	10.0	%
DET FLOW	14	ML/MIN
B/F FLOW	14	ML/MIN
AUX FLOW	0	ML/MIN
OVEN TEMP	40	C
AMB TEMP	30	C
MAX GAIN	1000	
ANALYSIS TIME	400.0	SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	485.5 MVS	16.6
2	UNKNOWN	0.538 MVS	34.8
3	UNKNOWN	1.735 MVS	40.7
4	UNKNOWN	0.343 MVS	66.9

## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-008BH

9.0-11.0 10G

10 MICROLITER INJECTION

0 2 4 6 8 10  
(x 1000 UV)

TIME PRINTED: MAY 13,95 11:54

SAMPLE TIME: MAY 13,95 11:47

## METHOD

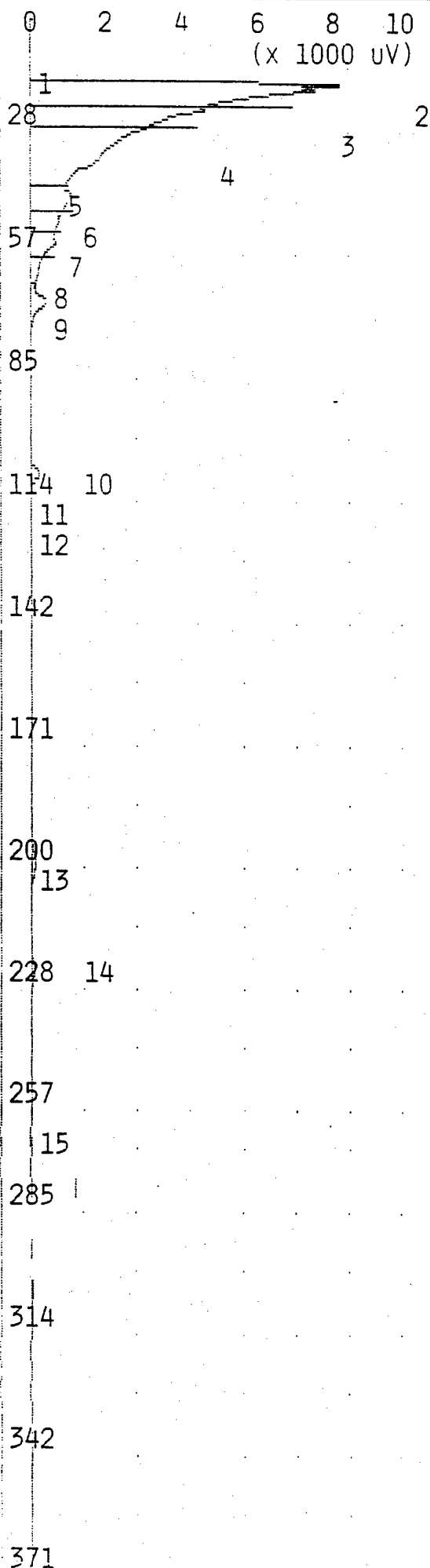
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.023 MVS	13.6
2	UNKNOWN	10.76 MVS	15.2
3	UNKNOWN	30.78 MVS	16.7
4	UNKNOWN	46.44 MVS	21.7
5	UNKNOWN	1.399 MVS	41.0
6	UNKNOWN	5.266 MVS	42.0
7	UNKNOWN	4.864 MVS	46.0
8	BENZENE	2.285 PPB	52.4
9	UNKNOWN	3.342 MVS	66.1
10	TOLUENE	1.706 PPB	105.0
11	UNKNOWN	0.121 MVS	115.3
12	UNKNOWN	0.133 MVS	122.5
13	UNKNOWN	6.735 MVS	197.4
14	ETHYLBENZENE	6.271 PPB	222.6
15	O-XYLENE	30.13 PPB	266.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-008BH RESHOT  
9.0-11.0 10G  
50 MICROLITER INJECTION



0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 13, 95 12:04

SAMPLE TIME: MAY 13, 95 11:58

## METHOD

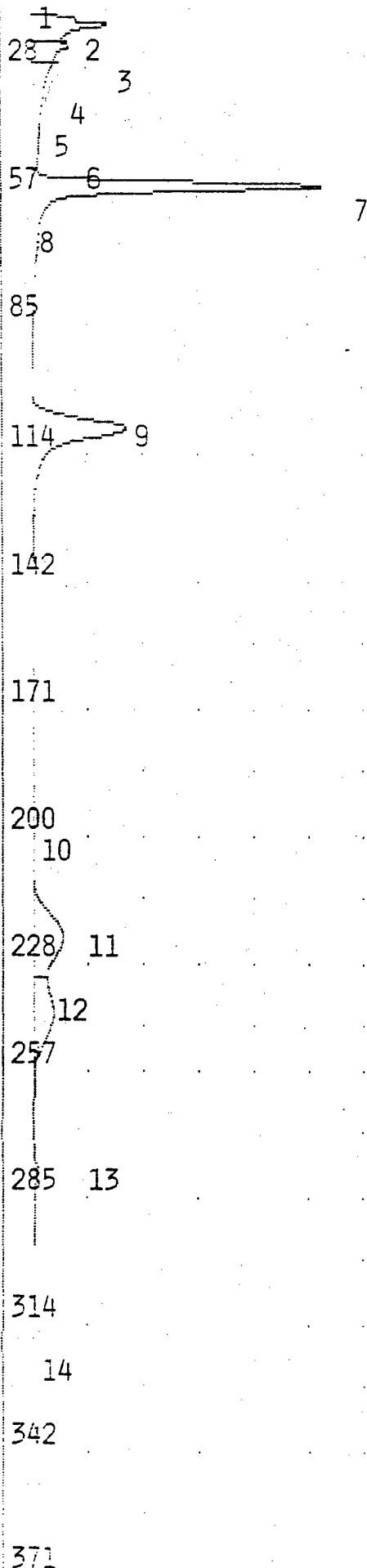
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

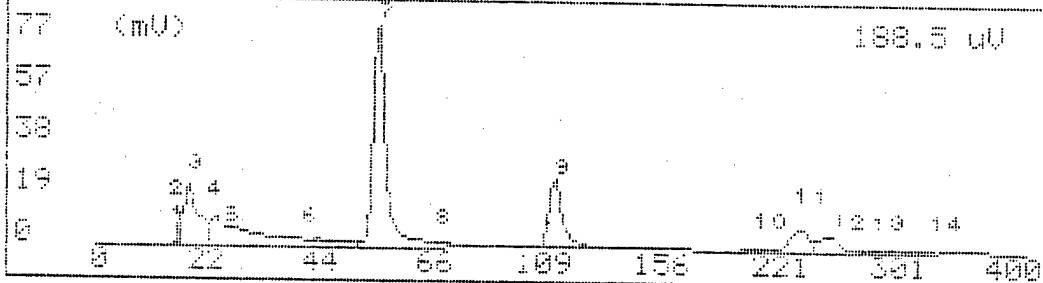
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.056 MVS	13.8
2	UNKNOWN	12.71 MVS	15.4
3	UNKNOWN	61.14 MVS	16.9
4	UNKNOWN	107.9 MVS	22.0
5	UNKNOWN	0.194 MVS	26.0
6	UNKNOWN	1.020 MVS	40.4
7	BENZENE	108.4 PPB	53.0
8	UNKNOWN	1.131 MVS	66.0
9	TOLUENE	94.77 PPB	106.5
10	UNKNOWN	8.266 MVS	197.2
11	ETHYLBENZENE	100.7 PPB	220.8
12	M,P-XYLENE	214.4 PPB	237.2
13	O-XYLENE	143.7 PPB	278.4
14	UNKNOWN	0.912 MVS	318.9

## NOTES

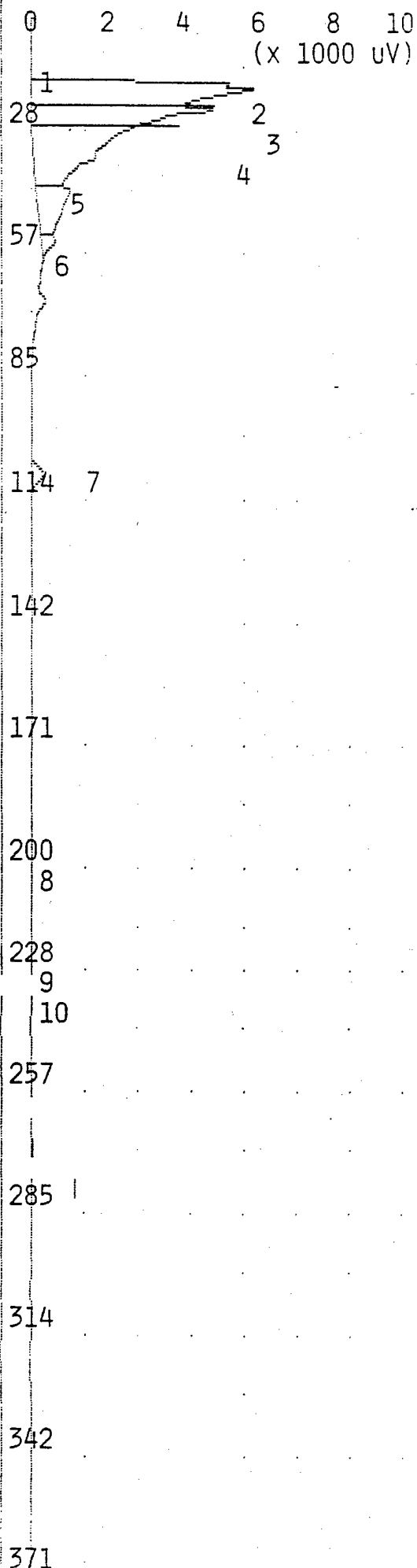
JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX



S.C. Keady		100+ GC Function	6	10	10	10
Analysis No 17		Run at	10.00	11.11	10.10	10
PK No	Name	Conc-Area	Alarm	Ref.	Line	
1	Unknown	1.0000	ALG	-No-	40	000
2	benzene	1.0000	PPD	-No-	41	000
3	Unknown	1.0000	PPD	-No-	42	000
4	toluene	1.0000	PPD	-No-	43	000
5	Unknown	1.0000	PPD	-No-	44	000
6	ethylbenzene	1.0000	PPD	-No-	45	000
7	m,p-xylene	1.0000	PPD	-No-	46	000
8	o-xylene	1.0000	PPD	-No-	47	000
9	Unknown	1.0000	PPD	-No-	48	000
- Detected 14 peaks. Use + + to scroll						



## ANALYSIS #18 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 13,95 12:17

SAMPLE TIME: MAY 13,95 12:10

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

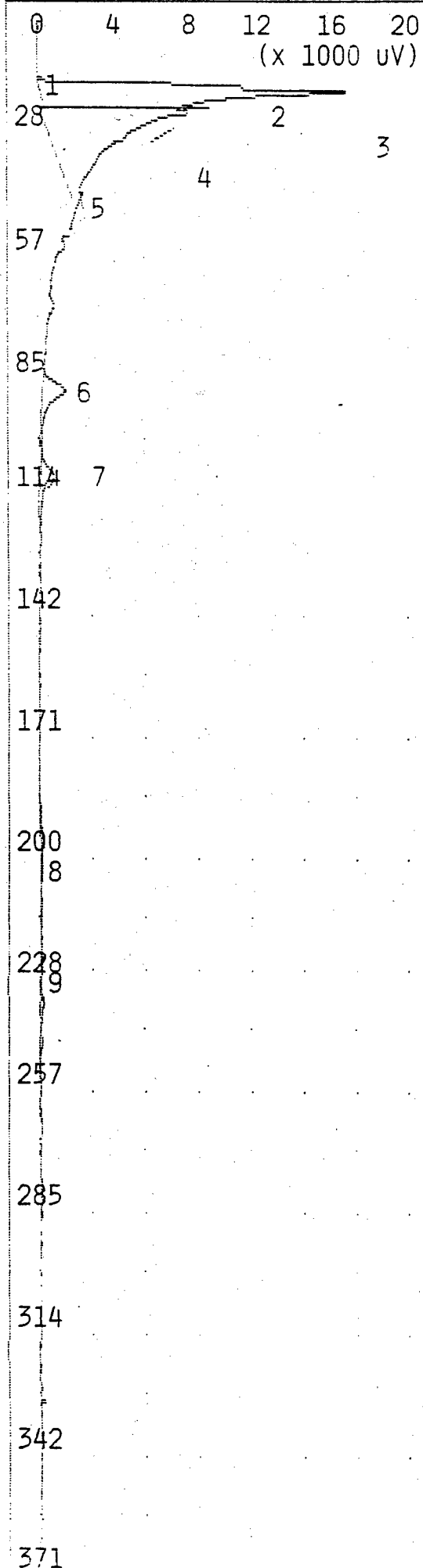
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.162 MVS	14.0
2	UNKNOWN	5.943 MVS	15.5
3	UNKNOWN	24.13 MVS	16.8
4	UNKNOWN	41.35 MVS	21.8
5	UNKNOWN	7.231 MVS	41.0
6	BENZENE	0.516 PPB	52.4
7	TOLUENE	1.721 PPB	106.9
8	UNKNOWN	1.523 MVS	197.0
9	ETHYLBENZENE	0.947 PPB	228.4
10	M,P-XYLENE	2.371 PPB	235.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

## ANALYSIS #19 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 13,95 12:27

SAMPLE TIME: MAY 13,95 12:21

## METHOD

SLOPE UP 1.000 MV/SEC  
SLOPE DOWN 3.000 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

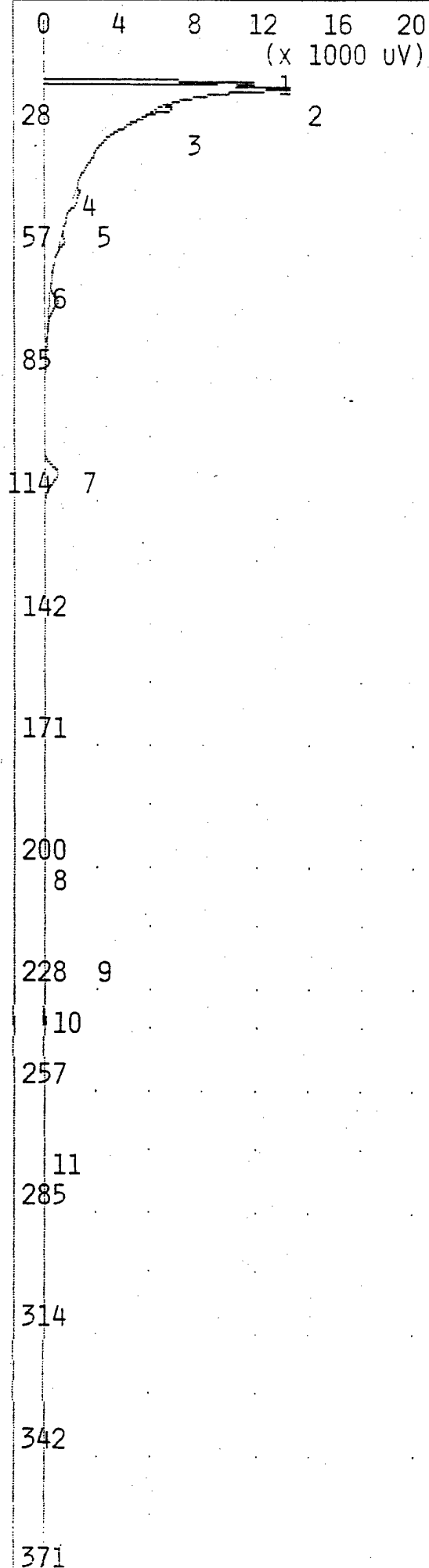
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.392 MVS	14.1
2	UNKNOWN	11.99 MVS	15.4
3	UNKNOWN	107.8 MVS	16.8
4	UNKNOWN	1.300 MVS	21.9
5	UNKNOWN	0.212 MVS	40.7
6	UNKNOWN	5.854 MVS	86.4
7	TOLUENE	3.075 PPB	106.8
8	UNKNOWN	0.903 MVS	200.8
9	ETHYLBENZENE	2.494 PPB	228.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-008BH  
13.0-15.0 10G





TIME PRINTED: MAY 13,95 12:37

SAMPLE TIME: MAY 13,95 12:31

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	13.18 MVS	14.8
2	UNKNOWN	144.0 MVS	16.3
3	UNKNOWN	1.143 MVS	21.3
4	UNKNOWN	0.577 MVS	40.9
5	BENZENE	0.124 PPB	52.3
6	UNKNOWN	1.633 MVS	66.1
7	TOLUENE	3.441 PPB	106.2
8	UNKNOWN	7.815 MVS	196.4
9	ETHYLBENZENE	7.276 PPB	220.4
10	M,P-XYLENE	16.50 PPB	237.4
11	O-XYLENE	8.636 PPB	273.6

## NOTES

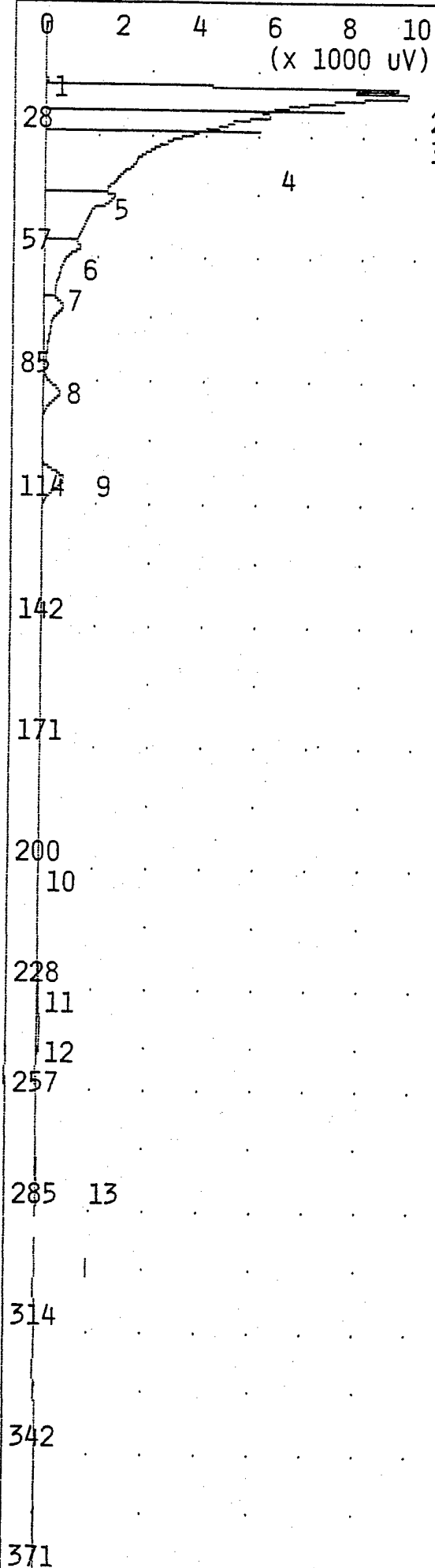
JOE BYRD, JR.

DULUTH ANGB

025-010BH

0.5- 2.5 10G

## ANALYSIS #21 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 13, 95 12:49  
 SAMPLE TIME: MAY 13, 95 12:42

## METHOD

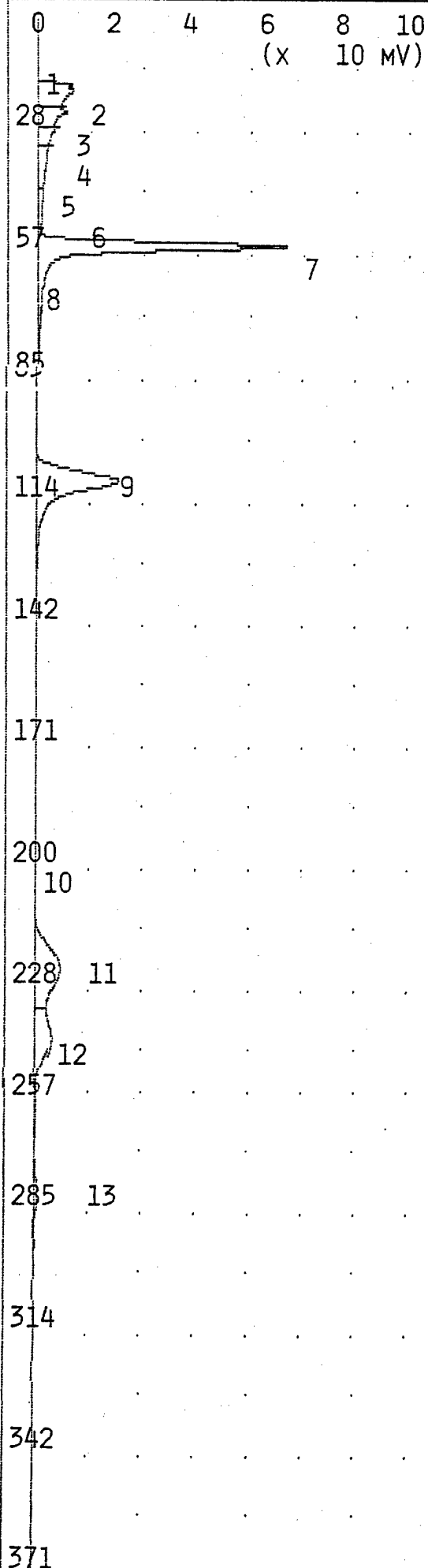
SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 32 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.191 MVS	13.9
2	UNKNOWN	11.09 MVS	15.5
3	UNKNOWN	39.59 MVS	17.0
4	UNKNOWN	61.22 MVS	22.0
5	UNKNOWN	16.12 MVS	40.9
6	BENZENE	3.302 PPB	52.9
7	UNKNOWN	5.111 MVS	66.1
8	UNKNOWN	3.420 MVS	86.5
9	TOLUENE	2.678 PPB	107.0
10	UNKNOWN	1.370 MVS	199.2
11	ETHYLBENZENE	1.206 PPB	226.2
12	M,P-XYLENE	2.937 PPB	238.6
13	O-XYLENE	1.854 PPB	276.5

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-010BH  
 5.0- 7.0 10G



TIME PRINTED: MAY 13,95 14:11

SAMPLE TIME: MAY 13,95 14:04

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 ΔMB TEMP 32 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

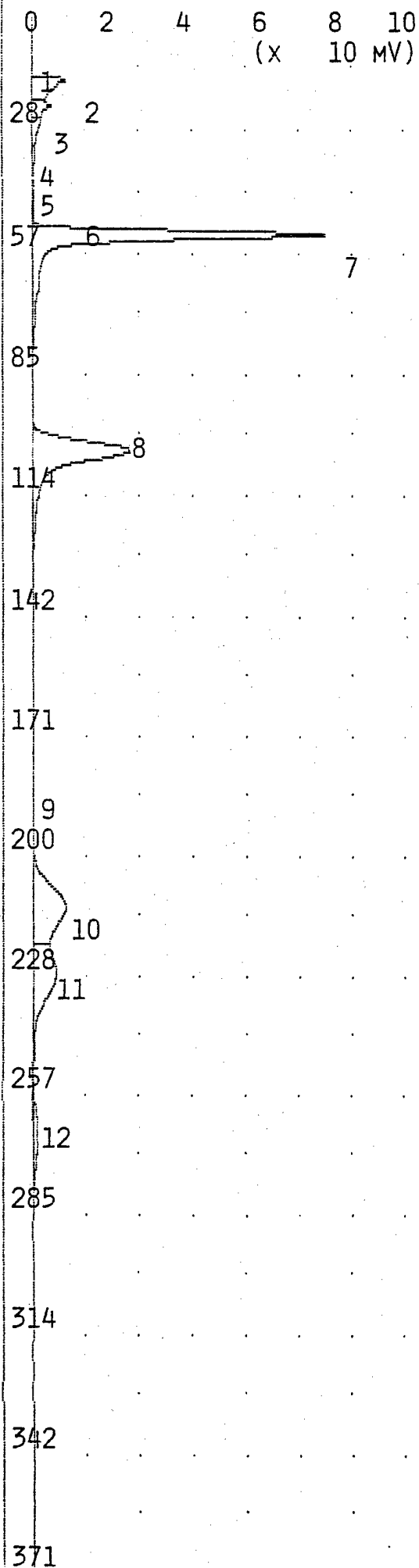
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.042 MVS	14.0
2	UNKNOWN	10.70 MVS	15.5
3	UNKNOWN	38.65 MVS	17.0
4	UNKNOWN	26.49 MVS	22.1
5	UNKNOWN	40.37 MVS	26.0
6	UNKNOWN	12.84 MVS	40.8
7	BENZENE	92.50 PPB	53.1
8	UNKNOWN	0.126 MVS	66.1
9	TOLUENE	91.84 PPB	106.8
10	UNKNOWN	3.060 MVS	197.4
11	ETHYLBENZENE	95.59 PPB	221.8
12	M,P-XYLENE	192.6 PPB	238.2
13	O-XYLENE	100.5 PPB	279.2

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 100 PPB BTEX

ANALYSIS #1 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 15,95 08:18

SAMPLE TIME: MAY 15,95 08:12

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.084 MVS	13.2
2	UNKNOWN	36.63 MVS	14.7
3	UNKNOWN	16.31 MVS	21.0
4	UNKNOWN	12.82 MVS	24.8
5	UNKNOWN	7.370 MVS	31.0
6	UNKNOWN	4.747 MVS	41.1
7	UNKNOWN	233.6 MVS	50.8
8	UNKNOWN	168.8 MVS	101.6
9	UNKNOWN	2.133 MVS	187.0
10	UNKNOWN	114.5 MVS	210.0
11	UNKNOWN	85.61 MVS	225.8
12	UNKNOWN	22.68 MVS	265.3

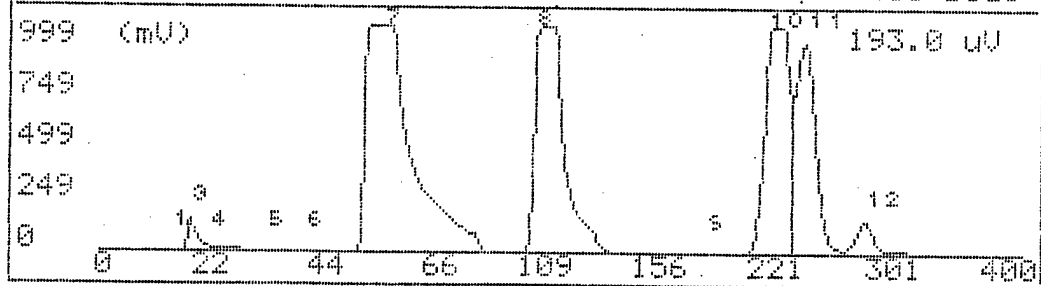
NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

G.C. Ready 10S+ GC Function May 15, 95 09:10  
 -- Analysis No 3 -- Run at - May 15, 95 08:55 -

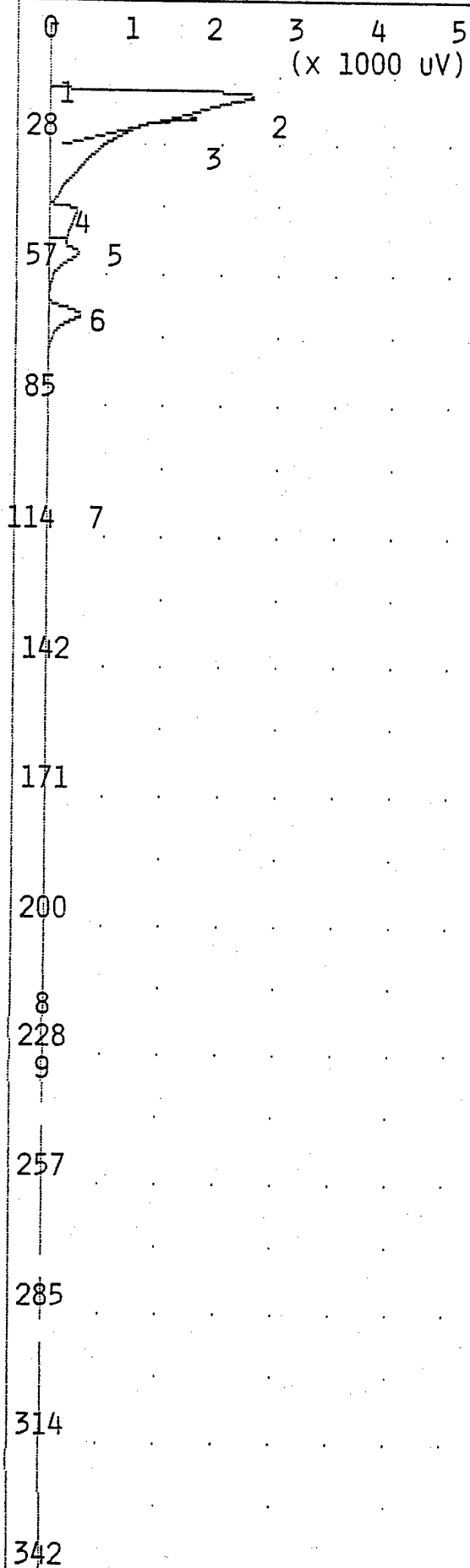
Pk No	Name	Conc/Area	Alarm	Ret. Time
4	Unknown	4.020 mUS	-No-	21.1 sec
5	Unknown	0.875 mUS	-No-	33.7 sec
6	Unknown	0.151 mUS	-No-	38.4 sec
7	benzene	10.00 ppm	-No-	52.2 sec
8	toluene	10.00 ppm	-No-	103.2 sec
9	Unknown	5.065 mUS	-No-	182.6 sec
10	ethylbenzene	10.00 ppm	-No-	212.4 sec
11	m,p-xylene	20.00 ppm	-No-	227.4 sec
12	o-xylene	10.02 ppm	-No-	266.6 sec

- Detected 12 peaks. Use + + to scroll [ 485 sec]



## ANALYSIS #4

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 15,95 09:18

SAMPLE TIME: MAY 15,95 09:12

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

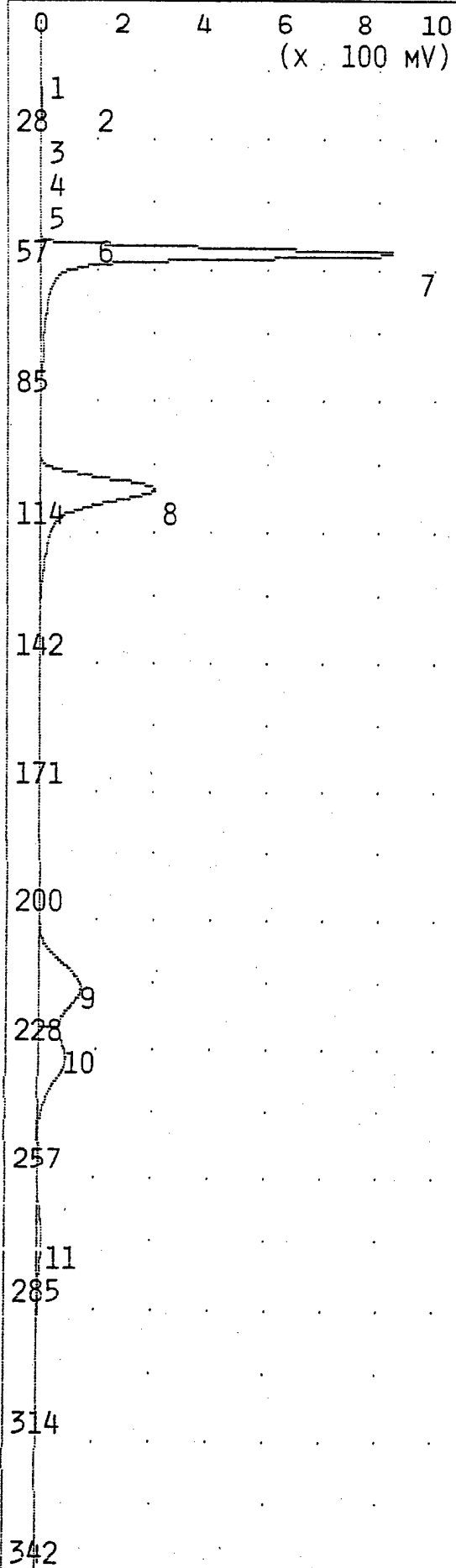
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.080 MVS	13.5
2	UNKNOWN	29.12 MVS	16.1
3	UNKNOWN	0.246 MVS	20.8
4	UNKNOWN	3.645 MVS	41.8
5	BENZENE	1.693 PPB	50.8
6	UNKNOWN	4.391 MVS	63.9
7	TOLUENE	0.895 PPB	102.4
8	ETHYLBENZENE	3.152 PPB	211.2
9	M,P-XYLENE	4.396 PPB	227.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

ANALYSIS #5

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 15,95 11:10

SAMPLE TIME: MAY 15,95 11:03

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 28 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

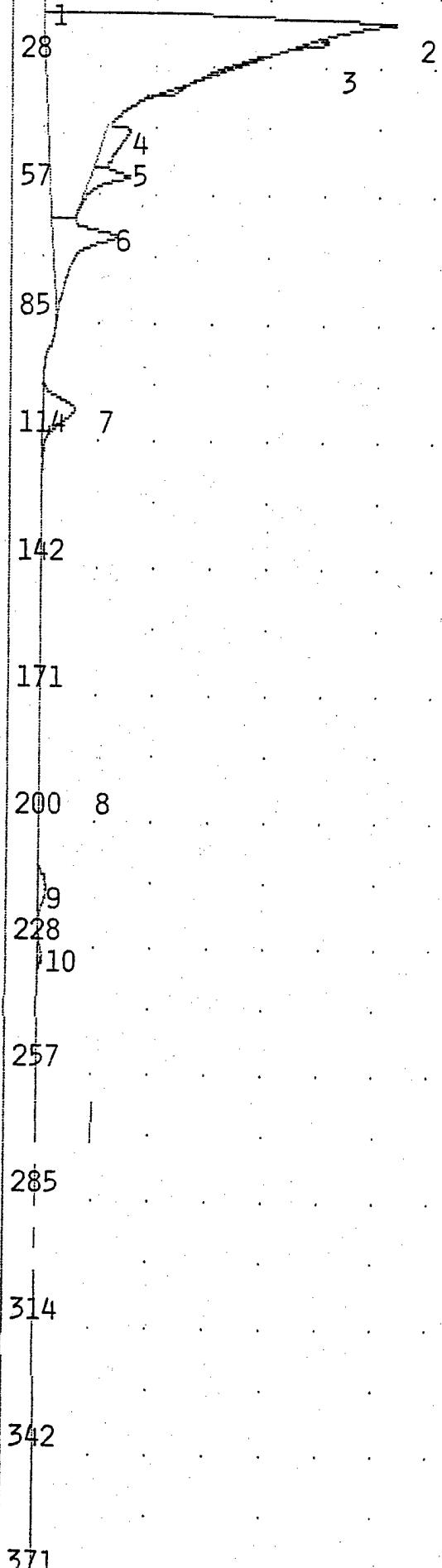
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.042 MVS	13.2
2	UNKNOWN	3.328 MVS	15.1
3	UNKNOWN	18.02 MVS	16.6
4	UNKNOWN	42.86 MVS	21.3
5	UNKNOWN	0.498 MVS	25.2
6	UNKNOWN	0.852 MVS	40.8
7	BENZENE	827.2 PPB	51.6
8	TOLUENE	778.3 PPB	103.0
9	ETHYLBENZENE	664.2 PPB	213.0
10	M,P-XYLENE	1.304 PPM	228.8
11	O-XYLENE	631.7 PPB	268.5

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
1 PPM BTEX

## ANALYSIS #6

## 10S+ GC FUNCTION ANALYSIS REPORT

0 1 2 3 4 5  
(x 1000 uV)

TIME PRINTED: MAY 15, 95 11:23

SAMPLE TIME: MAY 15, 95 11:17

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 28 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.030 MVS	13.3
2	UNKNOWN	74.80 MVS	16.6
3	UNKNOWN	0.021 MVS	21.2
4	UNKNOWN	2.117 MVS	41.1
5	BENZENE	0.690 PPB	51.3
6	UNKNOWN	5.865 MVS	64.6
7	TOLUENE	1.606 PPB	103.3
8	UNKNOWN	1.127 MVS	191.0
9	ETHYLBENZENE	2.951 PPB	212.6
10	M,P-XYLENE	3.487 PPB	229.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB

1 PPM BTEX

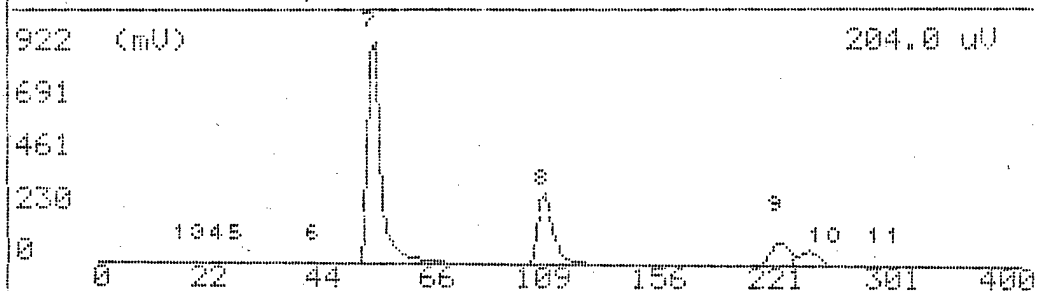
AIR BLANK JB

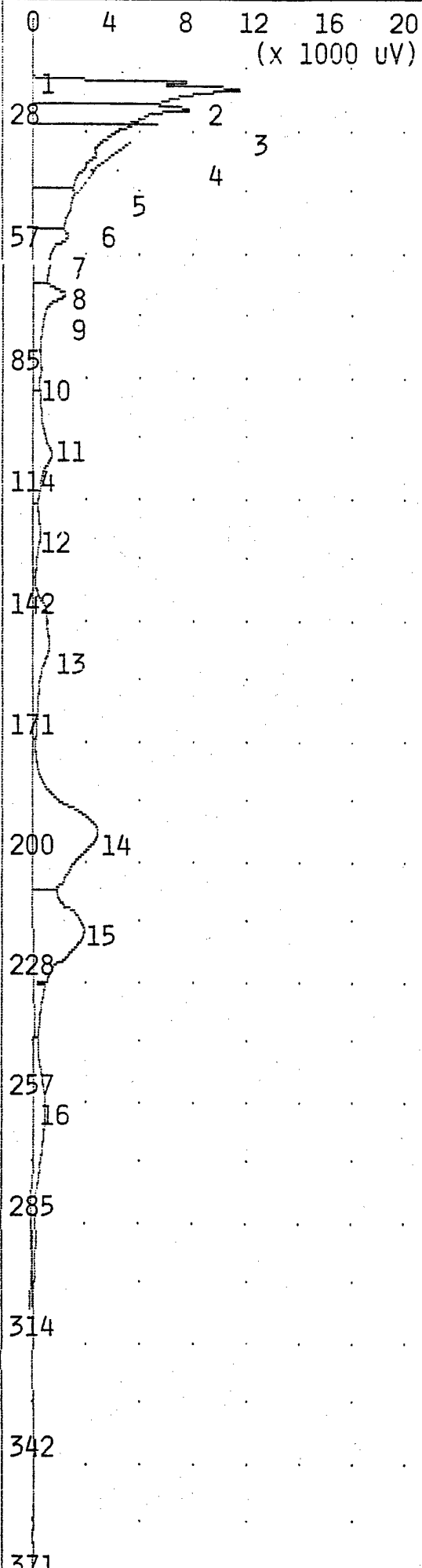


G.C. Ready 10S+ GC Function May 15, 95 11:15  
 -- Analysis No 5 -- Run at - May 15, 95 11:03 -

PK No	Name	Conc/Area	Alarm	Ret. Time
3	Unknown	18.02 mUS	-No-	16.6 sec
4	Unknown	42.93 mUS	-No-	21.3 sec
5	Unknown	0.498 mUS	-No-	25.2 sec
6	Unknown	0.852 mUS	-No-	40.8 sec
7	benzene	1.000 ppm	-No-	51.6 sec
8	toluene	1.000 ppm	-No-	103.0 sec
9	ethylbenzene	1.000 ppm	-No-	213.0 sec
10	m,p-xylene	2.000 ppm	-No-	228.0 sec
11	o-xylene	1.000 ppm	-No-	268.5 sec

- Detected 11 peaks. Use + + to scroll [ 405 sec]





TIME PRINTED: MAY 15,95 11:33

SAMPLE TIME: MAY 15,95 11:27

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.330 MVS	13.6
2	UNKNOWN	9.082 MVS	15.0
3	UNKNOWN	41.66 MVS	16.5
4	UNKNOWN	82.39 MVS	21.4
5	UNKNOWN	0.263 MVS	25.2
6	UNKNOWN	0.682 MVS	32.0
7	UNKNOWN	19.93 MVS	40.8
8	BENZENE	6.523 PPB	51.2
9	UNKNOWN	18.73 MVS	64.2
10	UNKNOWN	0.008 MVS	81.7
11	TOLUENE	9.838 PPB	101.8
12	UNKNOWN	5.590 MVS	120.0
13	UNKNOWN	18.84 MVS	147.0
14	UNKNOWN	60.17 MVS	191.0
15	ETHYLBENZENE	40.92 PPB	214.4
16	O-XYLENE	82.13 PPB	257.3

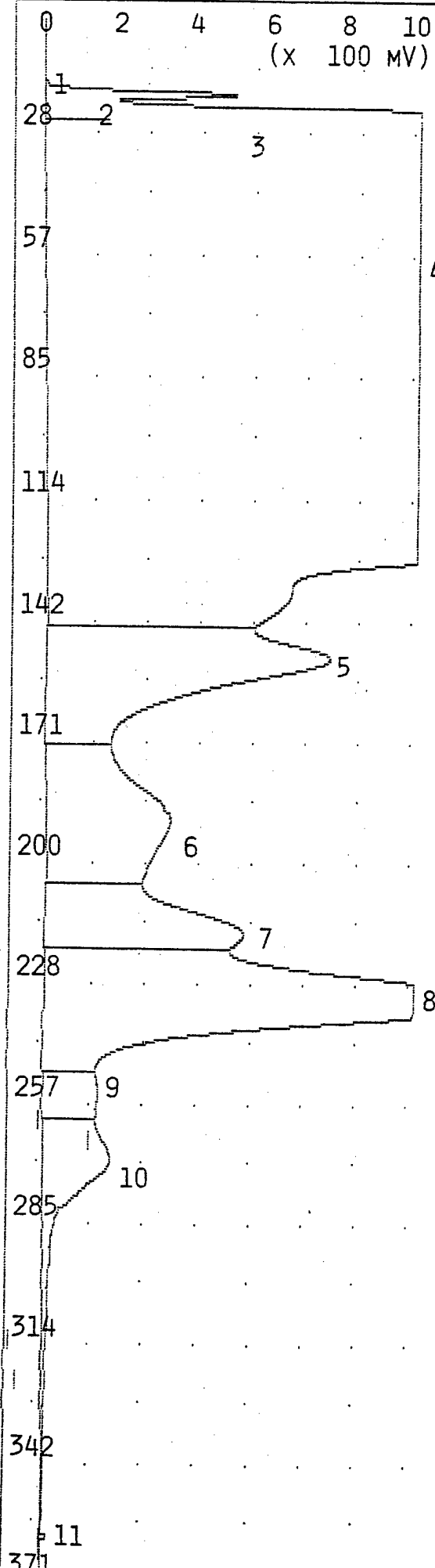
## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-003BH

0.5- 2.5 10G



TIME PRINTED: MAY 15,95 11:44

SAMPLE TIME: MAY 15,95 11:37

## METHOD

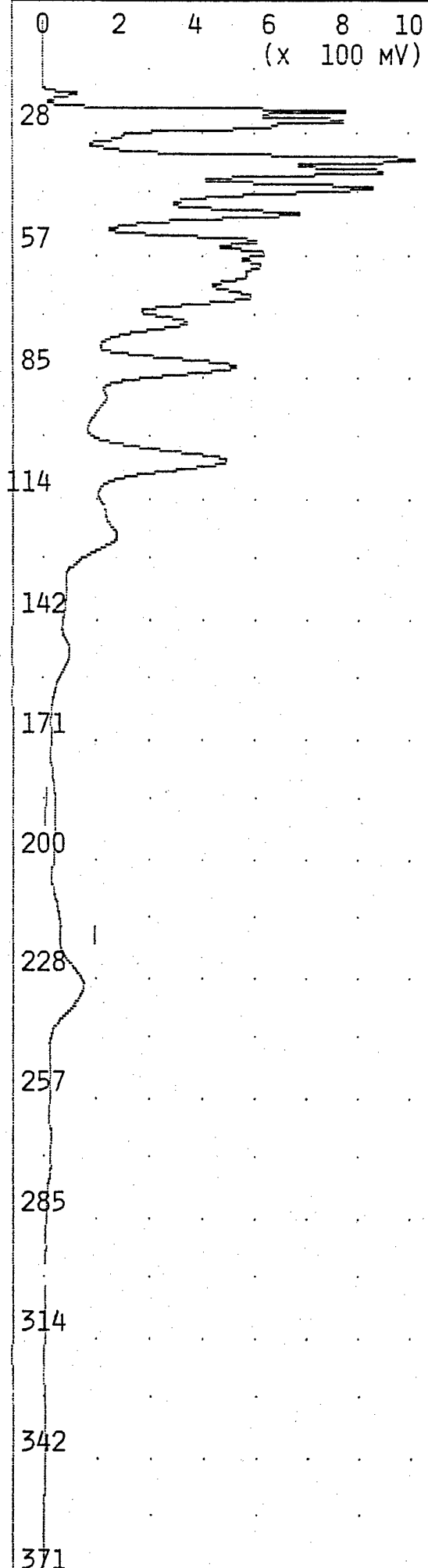
SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 29 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.903 MVS	14.0
2	UNKNOWN	6.847 MVS	15.0
3	UNKNOWN	1.065 VSEC	17.8
4	UNKNOWN	3694. VSEC	58.0
5	UNKNOWN	12.53 VSEC	149.4
6	UNKNOWN	8.940 VSEC	188.2
7	ETHYLBENZENE	3.621 PPM	214.6
8	M,P-XYLENE	35.65 PPM	230.2
9	UNKNOWN	1.673 VSEC	252.2
10	O-XYLENE	15.05 PPM	268.2
11	UNKNOWN	61.29 MVS	358.6

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-003BH  
 5.0- 7.0 10G



TIME PRINTED: MAY 15,95 11:55

SAMPLE TIME: MAY 15,95 11:49

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 14 ML/MIN

B/F FLOW 14 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 29 C

MAX GAIN 1000

ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK COMPOUND NAME AREA/CONC R.T.

## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-003BH RESHOT

5.0- 7.0 10G

10 MICROLITER INJECTION

0 2 4 6 8 10  
(x 100 MV)

TIME PRINTED: MAY 15,95 12:08

SAMPLE TIME: MAY 15,95 12:01

## METHOD

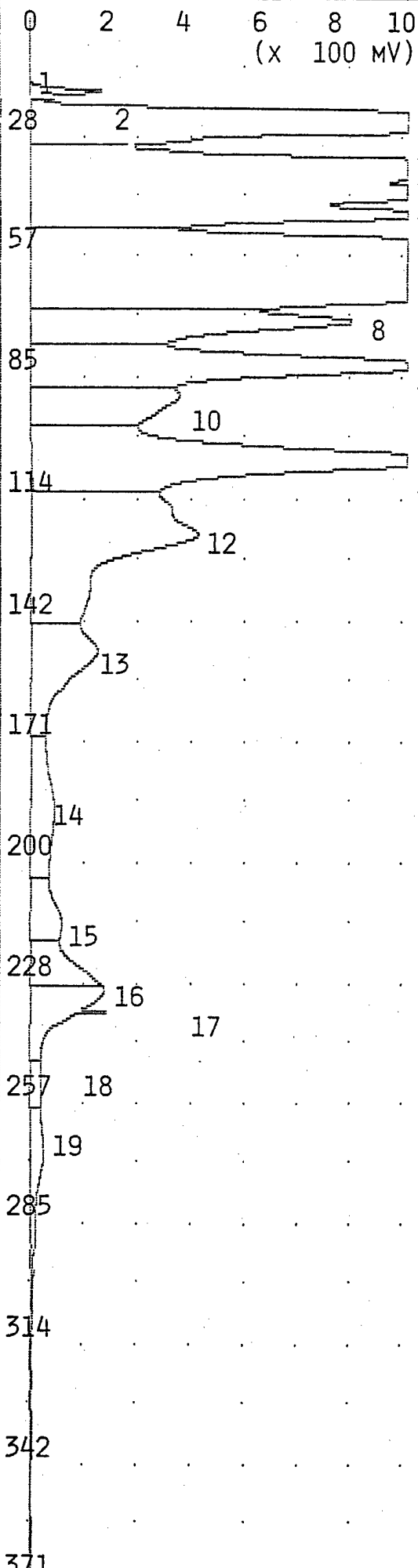
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

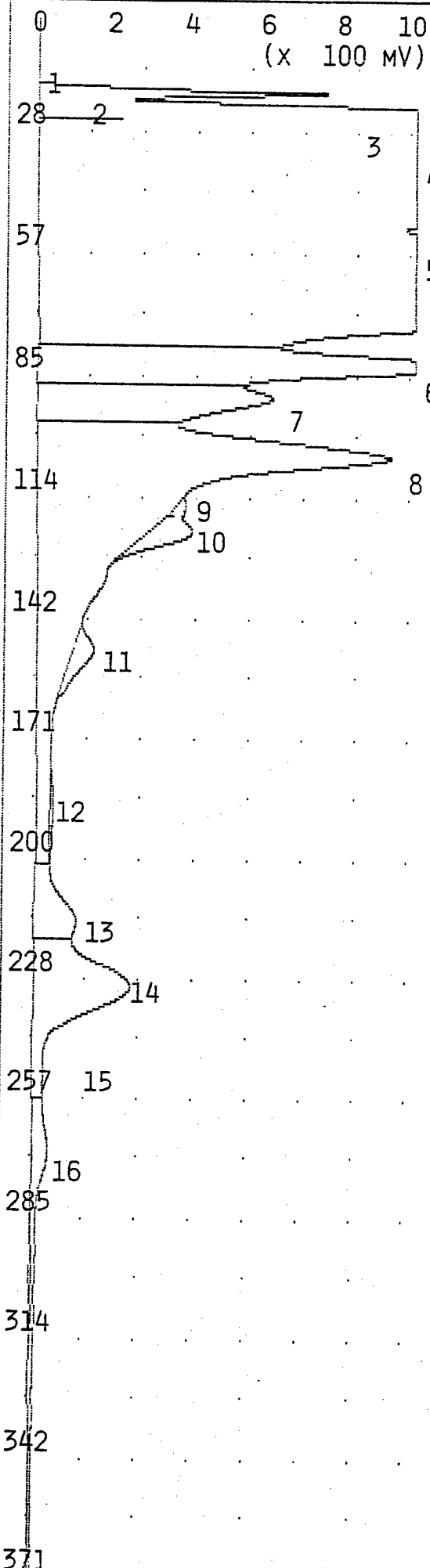
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.276 MVS	13.6
2	UNKNOWN	329.3 MVS	17.4
3	UNKNOWN	18.56 VSEC	23.3
4	UNKNOWN	14.87 VSEC	34.4
5	UNKNOWN	5.542 VSEC	39.8
6	UNKNOWN	5.542 VSEC	45.4
7	UNKNOWN	77.85 VSEC	57.9
8	UNKNOWN	5.012 VSEC	70.6
9	UNKNOWN	7.924 VSEC	81.0
10	UNKNOWN	3.185 VSEC	88.2
11	TOLUENE	4.792 PPM	103.2
12	UNKNOWN	8.105 VSEC	120.5
13	UNKNOWN	2.722 VSEC	148.0
14	UNKNOWN	1.677 VSEC	185.8
15	ETHYLBENZENE	747.1 PPB	212.6
16	M,P-XYLENE	2.743 PPM	227.8
17	UNKNOWN	1.656 VSEC	233.6
18	UNKNOWN	305.3 MVS	250.9
19	O-XYLENE	4.034 PPM	266.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-003BH RE-RESHO  
5.0- 7.0 10G  
20 MICROLITER INJECTION



## ANALYSIS #11 10S+ GC FUNCTION ANALYSIS REPORT

TIME PRINTED: MAY 15,95 12:21  
SAMPLE TIME: MAY 15,95 12:15

## METHOD

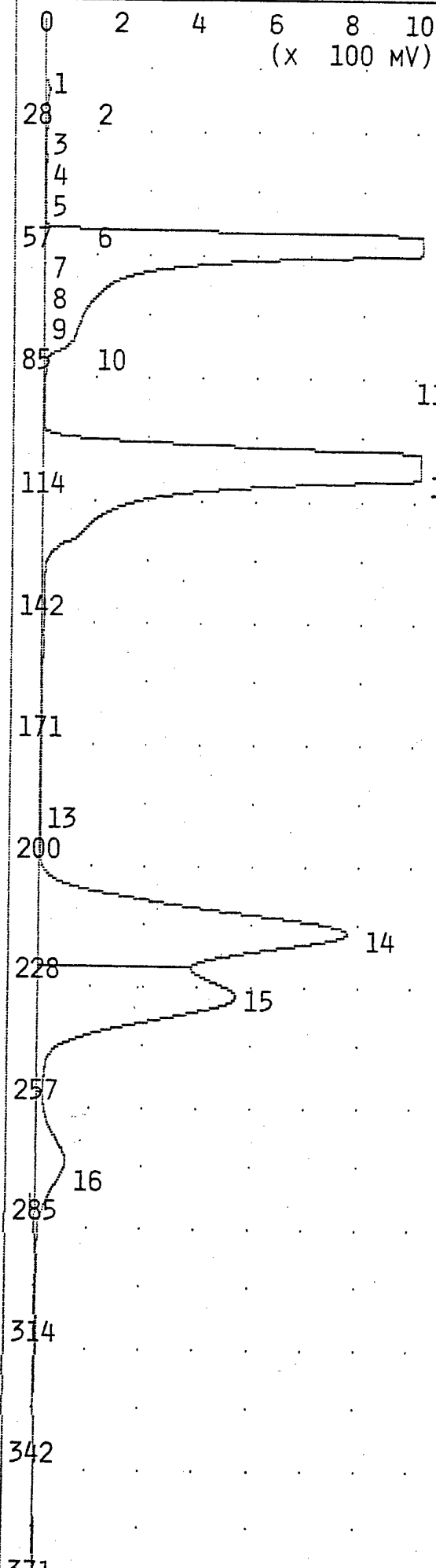
SLOPE UP	0.500	MV/SEC
SLOPE DOWN	1.500	MV/SEC
MIN AREA	0.000	MVSEC
MIN HEIGHT	0.000	MV
ANALYSIS DELAY	0.0	SEC
WINDOW PERCENT	10.0	%
DET FLOW	14	ML/MIN
B/F FLOW	14	ML/MIN
AUX FLOW	0	ML/MIN
OVEN TEMP	40	C
AMB TEMP	30	C
MAX GAIN	1000	
ANALYSIS TIME	400.0	SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.666 MVS	13.7
2	UNKNOWN	3.453 MVS	14.6
3	UNKNOWN	1.461 VSEC	17.5
4	UNKNOWN	256.3 VSEC	34.5
5	UNKNOWN	53.70 VSEC	59.2
6	UNKNOWN	9.080 VSEC	81.0
7	UNKNOWN	4.846 VSEC	88.8
8	TOLUENE	9.510 PPM	102.5
9	UNKNOWN	107.9 MVS	114.1
10	UNKNOWN	688.4 MVS	120.1
11	UNKNOWN	536.7 MVS	148.2
12	UNKNOWN	92.82 MVS	184.8
13	ETHYLBENZENE	1.044 PPM	212.8
14	M,P-XYLENE	7.292 PPM	228.2
15	UNKNOWN	0.840 MVS	249.8
16	O-XYLENE	5.399 PPM	267.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-003BH  
10.0-12.0 10G  
20 MICROLITER INJECTION



TIME PRINTED: MAY 15, 95 12:36

SAMPLE TIME: MAY 15, 95 12:29

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 30 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.034 MVS	13.4
2	UNKNOWN	9.058 MVS	15.2
3	UNKNOWN	52.39 MVS	16.6
4	UNKNOWN	28.07 MVS	21.6
5	UNKNOWN	16.67 MVS	23.8
6	UNKNOWN	33.21 MVS	25.4
7	UNKNOWN	23.63 MVS	32.6
8	UNKNOWN	17.08 MVS	35.4
9	UNKNOWN	27.79 MVS	39.2
10	UNKNOWN	17.45 MVS	45.2
11	BENZENE	8.717 PPM	52.6
12	TOLUENE	8.469 PPM	104.1
13	UNKNOWN	2.660 MVS	183.0
14	ETHYLBENZENE	5.511 PPM	213.8
15	M,P-XYLENE	11.62 PPM	228.6
16	O-XYLENE	5.805 PPM	268.0

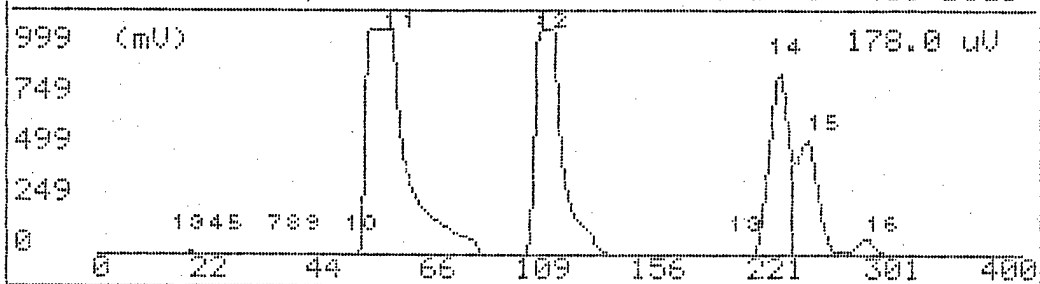
## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 10 PPM BTEX

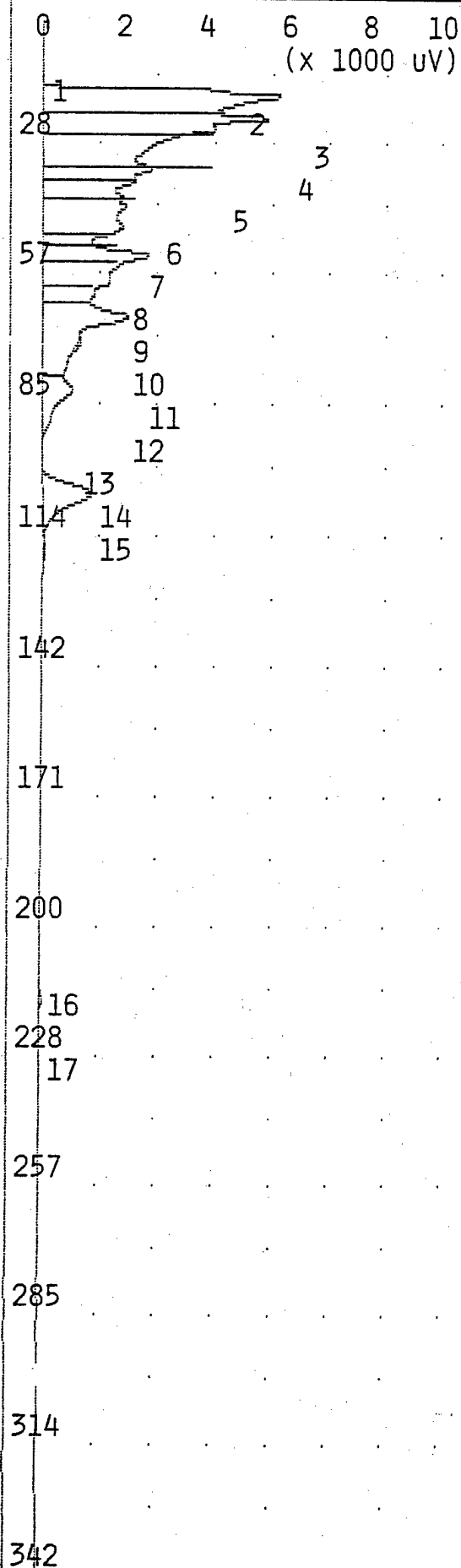
G.C. Ready 106+ GC Function May 15, 95 12:41  
 -- Analysis No 12 -- Run at - May 15, 95 12:29 -

Pk No	Name	Conc/Area	Alarm	Ret. Time
8	Unknown	17.10 mUS	-No-	35.4 sec
9	Unknown	27.84 mUS	-No-	39.2 sec
10	Unknown	17.49 mUS	-No-	45.2 sec
11	benzene	10.00 ppm	-No-	52.6 sec
12	toluene	10.00 ppm	-No-	104.1 sec
13	Unknown	2.660 mUS	-No-	183.0 sec
14	ethylbenzene	10.00 ppm	-No-	213.8 sec
15	m,p-xylene	20.00 ppm	-No-	228.6 sec
16	o-xylene	10.03 ppm	-No-	268.0 sec

- Detected 16 peaks. Use + + to scroll [ 405 sec]







TIME PRINTED: MAY 15,95 12:50

SAMPLE TIME: MAY 15,95 12:43

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

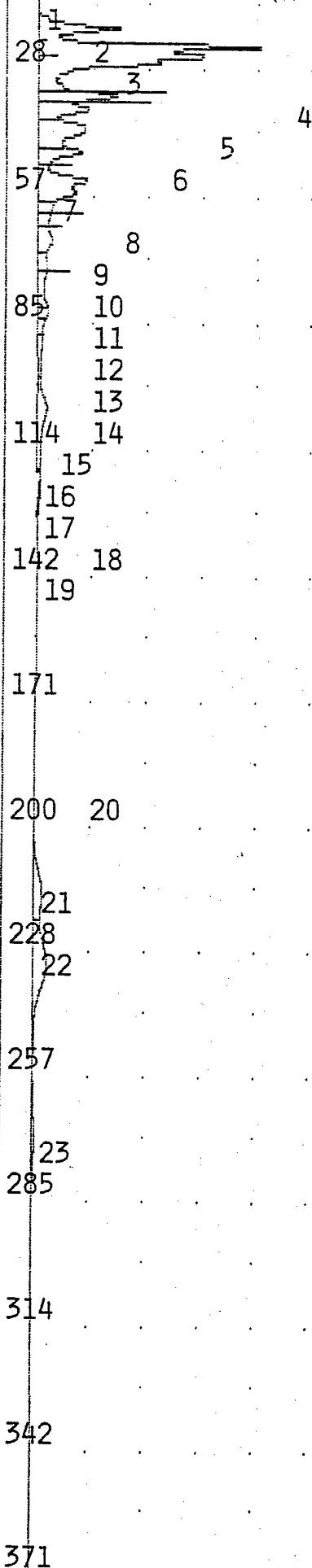
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.235 MVS	13.6
2	UNKNOWN	4.557 MVS	15.2
3	UNKNOWN	24.47 MVS	16.4
4	UNKNOWN	15.12 MVS	21.4
5	UNKNOWN	25.13 MVS	23.8
6	UNKNOWN	10.78 MVS	32.4
7	UNKNOWN	6.933 MVS	35.4
8	UNKNOWN	5.087 MVS	39.0
9	UNKNOWN	8.078 MVS	40.8
10	UNKNOWN	10.13 MVS	45.4
11	BENZENE	10.50 PPB	51.4
12	UNKNOWN	20.04 MVS	64.5
13	UNKNOWN	0.209 MVS	70.5
14	UNKNOWN	7.013 MVS	81.0
15	TOLUENE	5.070 PPB	103.4
16	ETHYLBENZENE	10.61 PPB	214.8
17	M,P-XYLENE	25.08 PPB	229.6

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

0 4 8 12 16 20  
(X 10 MV)



TIME PRINTED: MAY 15,95 13:02  
SAMPLE TIME: MAY 15,95 12:55

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

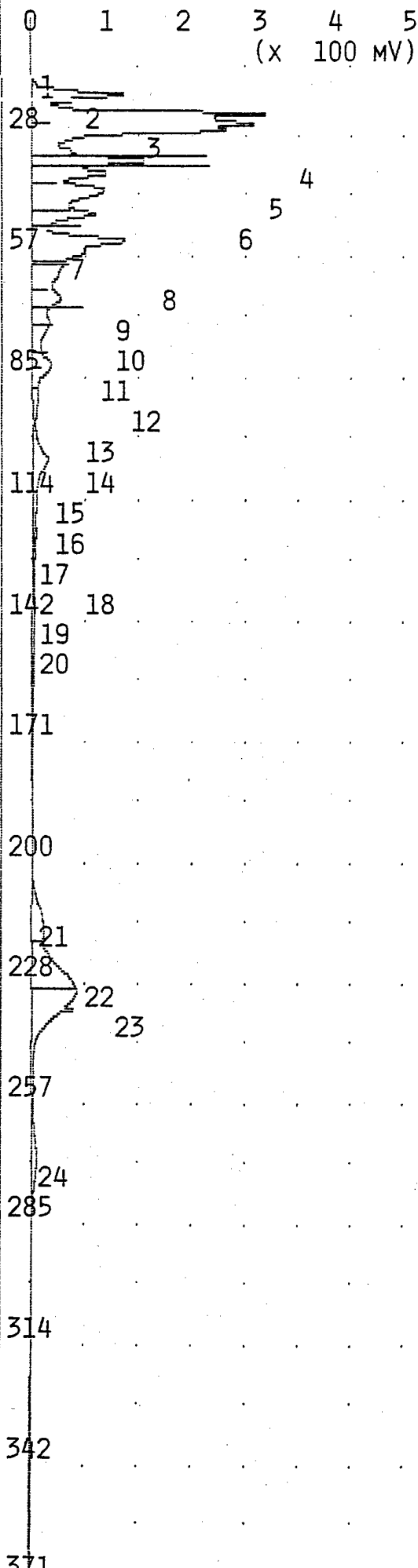
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.265 MVS	13.7
2	UNKNOWN	4.559 MVS	14.8
3	UNKNOWN	85.55 MVS	17.5
4	UNKNOWN	191.6 MVS	21.4
5	UNKNOWN	170.6 MVS	23.8
6	UNKNOWN	118.8 MVS	25.3
7	UNKNOWN	19.67 MVS	30.2
8	UNKNOWN	98.63 MVS	32.5
9	UNKNOWN	67.94 MVS	35.6
10	UNKNOWN	45.24 MVS	39.5
11	UNKNOWN	55.97 MVS	40.5
12	UNKNOWN	77.21 MVS	45.2
13	BENZENE	28.22 PPB	51.4
14	UNKNOWN	89.39 MVS	54.2
15	UNKNOWN	40.05 MVS	64.8
16	UNKNOWN	34.25 MVS	70.6
17	UNKNOWN	53.57 MVS	80.6
18	TOLUENE	42.57 PPB	103.0
19	UNKNOWN	2.261 MVS	119.6
20	UNKNOWN	0.776 MVS	190.2
21	ETHYLBENZENE	40.78 PPB	213.6
22	M,P-XYLENE	228.3 PPB	229.4
23	O-XYLENE	83.58 PPB	268.8

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-003BH

15-17 10g }  
20 µl injection } J3



TIME PRINTED: MAY 15,95 13:13  
 SAMPLE TIME: MAY 15,95 13:06

## METHOD

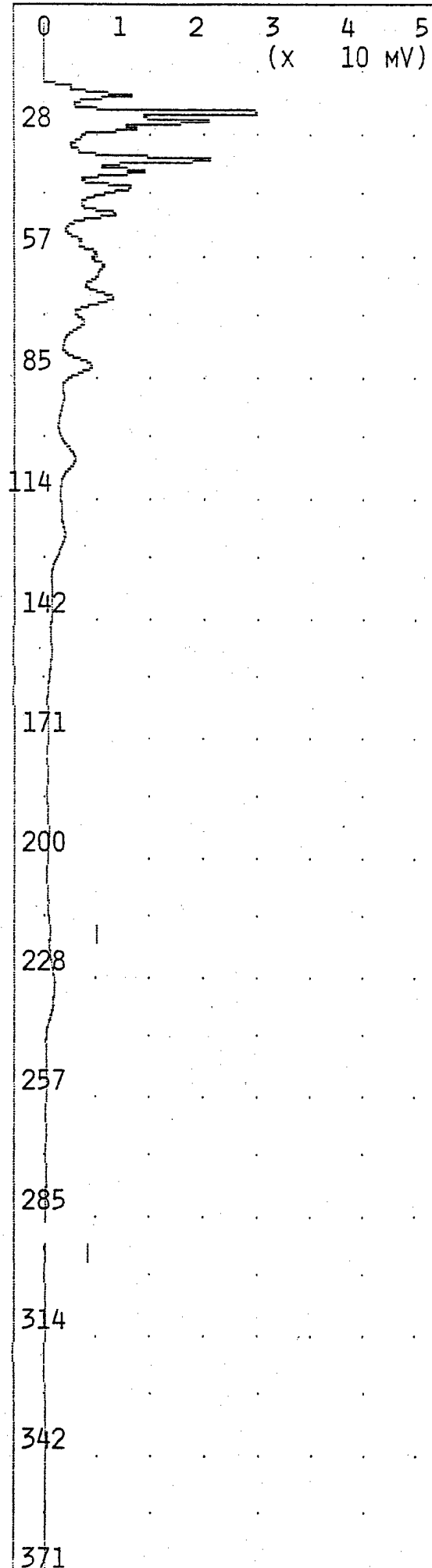
SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 30 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.842 MVS	13.8
2	UNKNOWN	6.142 MVS	14.8
3	UNKNOWN	238.5 MVS	17.6
4	UNKNOWN	510.2 MVS	21.5
5	UNKNOWN	622.9 MVS	24.0
6	UNKNOWN	492.6 MVS	25.4
7	UNKNOWN	85.06 MVS	30.2
8	UNKNOWN	376.1 MVS	32.6
9	UNKNOWN	254.6 MVS	35.6
10	UNKNOWN	402.8 MVS	39.6
11	UNKNOWN	296.3 MVS	45.4
12	BENZENE	137.7 PPB	51.6
13	UNKNOWN	388.1 MVS	54.2
14	UNKNOWN	197.7 MVS	64.9
15	UNKNOWN	144.0 MVS	70.8
16	UNKNOWN	155.2 MVS	80.9
17	UNKNOWN	55.99 MVS	88.4
18	TOLUENE	156.7 PPB	102.8
19	UNKNOWN	4.711 MVS	120.5
20	UNKNOWN	3.300 MVS	148.6
21	ETHYLBENZENE	122.6 PPB	213.2
22	M,P-XYLENE	916.4 PPB	228.2
23	UNKNOWN	444.7 MVS	232.8
24	O-XYLENE	553.4 PPB	268.5

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-003BH  
 20.0-22.0 10G  
 50 MICROLITER INJECTOR



TIME PRINTED: MAY 15,95 13:45

SAMPLE TIME: MAY 15,95 13:39

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 14 ML/MIN

B/F FLOW 14 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 30 C

MAX GAIN 1000

ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
----	---------------	-----------	------

## NOTES

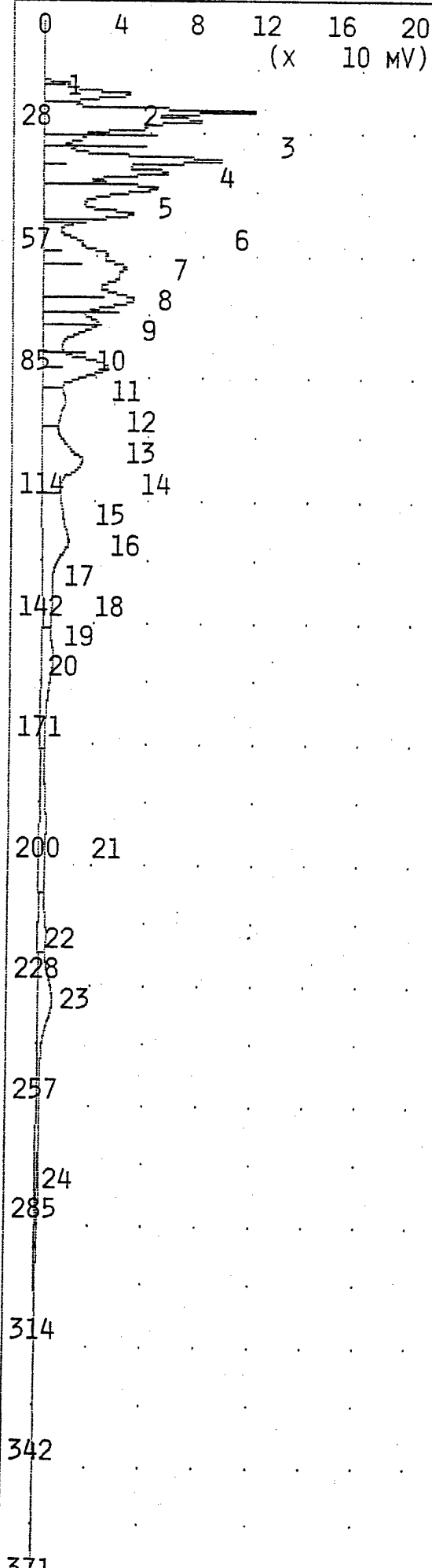
JOE BYRD, JR.

DULUTH ANGB

025-003BH

25.0' 10G

20 MICROLITER INJECTON



TIME PRINTED: MAY 15,95 13:57

SAMPLE TIME: MAY 15,95 13:51

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 30 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	16.03 MVS	15.1
2	UNKNOWN	122.2 MVS	17.7
3	UNKNOWN	195.3 MVS	21.6
4	UNKNOWN	160.9 MVS	23.9
5	UNKNOWN	126.8 MVS	25.4
6	UNKNOWN	244.5 MVS	32.9
7	UNKNOWN	164.4 MVS	35.8
8	UNKNOWN	217.5 MVS	39.6
9	UNKNOWN	172.4 MVS	45.6
10	BENZENE	20.46 PPB	51.6
11	UNKNOWN	96.80 MVS	54.7
12	UNKNOWN	143.5 MVS	57.8
13	UNKNOWN	115.1 MVS	59.9
14	UNKNOWN	242.2 MVS	65.3
15	UNKNOWN	161.4 MVS	71.0
16	UNKNOWN	206.2 MVS	81.3
17	UNKNOWN	96.68 MVS	89.2
18	TOLUENE	118.3 PPB	102.9
19	UNKNOWN	275.6 MVS	121.6
20	UNKNOWN	118.0 MVS	149.4
21	UNKNOWN	92.00 MVS	190.0
22	ETHYLBENZENE	42.25 PPB	214.4
23	M,P-XYLENE	363.7 PPB	230.0
24	O-XYLENE	46.73 PPB	266.6

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-003BH RESHOT  
 25.0' 10G  
 100 MICROLITER INJECTION

0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 15,95 14:08

SAMPLE TIME: MAY 15,95 14:02

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.077 MVS	13.8
2	UNKNOWN	9.573 MVS	15.1
3	UNKNOWN	49.16 MVS	17.6
4	UNKNOWN	61.85 MVS	21.7
5	UNKNOWN	33.52 MVS	23.8
6	UNKNOWN	17.83 MVS	25.5
7	UNKNOWN	18.59 MVS	27.6
8	UNKNOWN	63.77 MVS	32.7
9	UNKNOWN	52.54 MVS	35.7
10	UNKNOWN	39.50 MVS	39.5
11	UNKNOWN	58.61 MVS	46.0
12	BENZENE	12.64 PPB	54.6
13	UNKNOWN	78.24 MVS	58.0
14	UNKNOWN	337.6 MVS	66.0
15	UNKNOWN	51.08 MVS	81.3
16	UNKNOWN	65.62 MVS	89.4
17	TOLUENE	152.1 PPB	101.8
18	UNKNOWN	63.00 MVS	120.9
19	UNKNOWN	42.42 MVS	131.2
20	UNKNOWN	48.59 MVS	147.8
21	UNKNOWN	41.26 MVS	191.8
22	ETHYLBENZENE	12.14 PPB	214.8
23	M,P-XYLENE	30.80 PPB	229.8

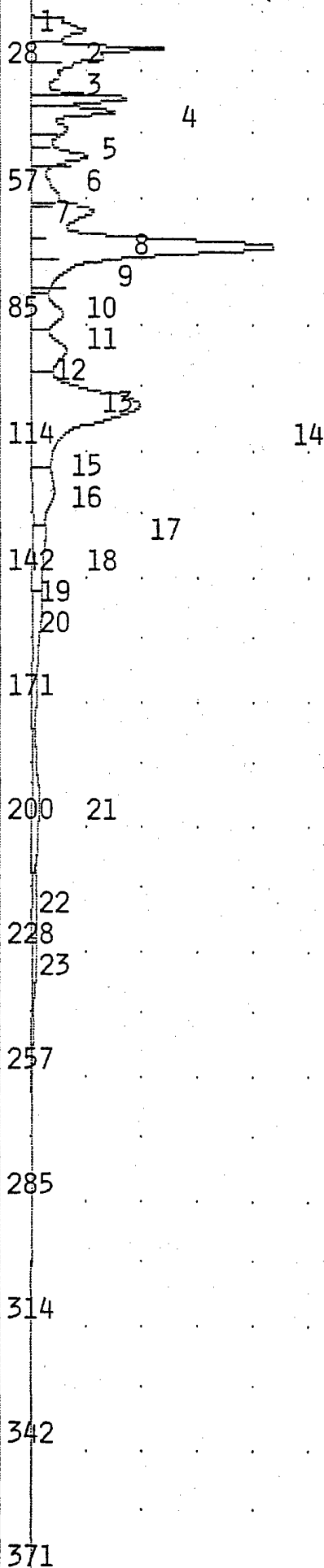
## NOTES

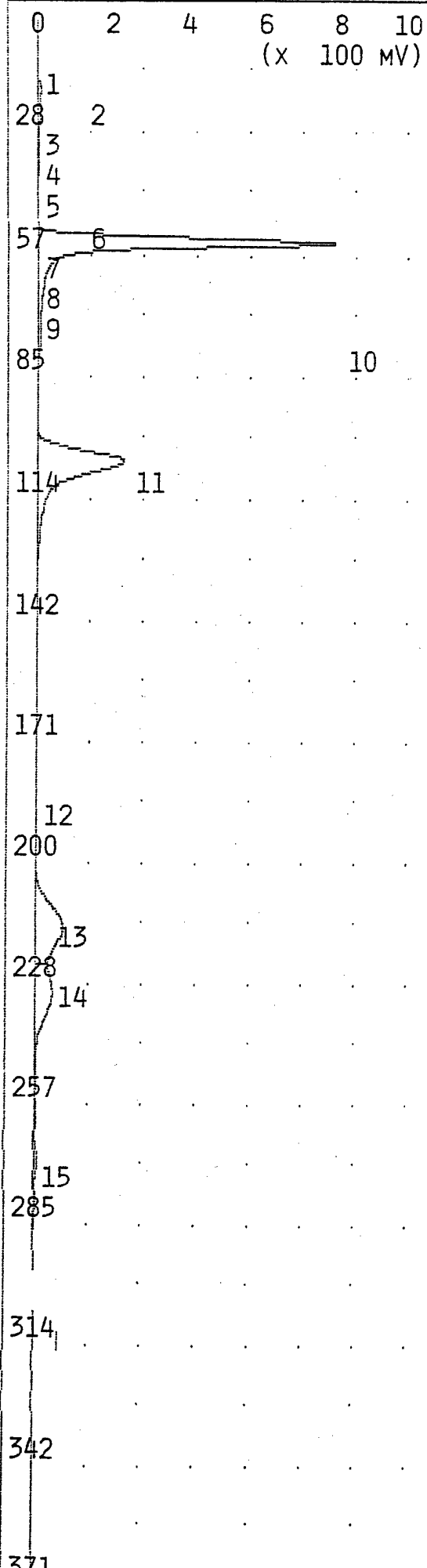
JOE BYRD, JR.

DULUTH ANGB

025-002BH

0.5- 2.5 10G





TIME PRINTED: MAY 15,95 14:24

SAMPLE TIME: MAY 15,95 14:18

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

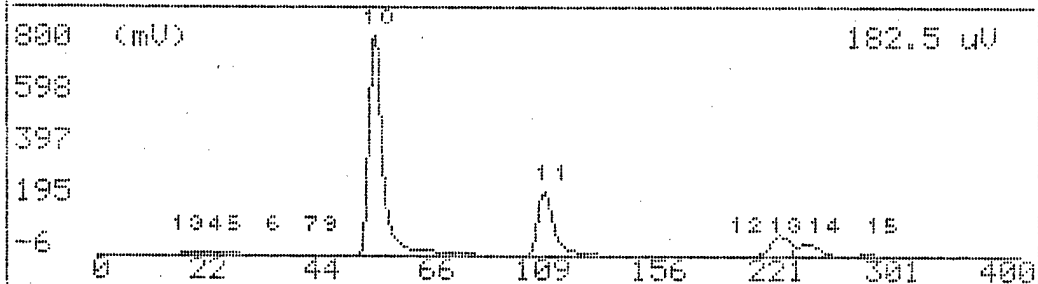
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.042 MVS	13.3
2	UNKNOWN	10.22 MVS	15.2
3	UNKNOWN	47.62 MVS	16.6
4	UNKNOWN	113.9 MVS	21.7
5	UNKNOWN	0.348 MVS	25.4
6	UNKNOWN	1.325 MVS	32.4
7	UNKNOWN	0.311 MVS	38.9
8	UNKNOWN	0.614 MVS	40.8
9	UNKNOWN	0.499 MVS	44.9
10	BENZENE	899.5 PPB	52.0
11	TOLUENE	828.1 PPB	103.3
12	UNKNOWN	11.85 MVS	186.6
13	ETHYLBENZENE	717.6 PPB	213.2
14	M,P-XYLENE	1.437 PPM	228.6
15	O-XYLENE	823.8 PPB	268.2

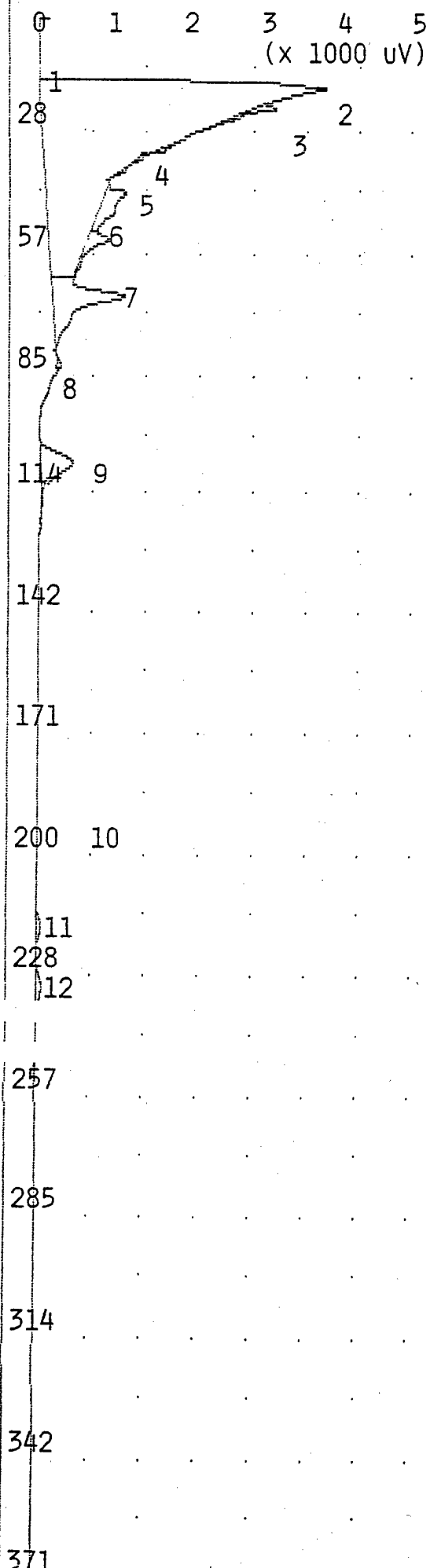
## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
1 PPM BTEX

G.C. Ready		108+ GC Function		May 15, 95 14:30	
-- Analysis No 19		-- Run at -		May 15, 95 14:18 -	
Pk No	Name	Conc/Area	Alarm	Ret. Time	
7	Unknown	0.311 mUS	-No-	38.9	sec
8	Unknown	0.614 mUS	-No-	40.8	sec
9	Unknown	0.499 mUS	-No-	44.9	sec
10	benzene	1.000 ppm	-No-	52.0	sec
11	toluene	1.000 ppm	-No-	103.3	sec
12	Unknown	11.85 mUS	-No-	186.6	sec
13	ethylbenzene	1.000 ppm	-No-	213.2	sec
14	m,p-xylene	2.000 ppm	-No-	228.6	sec
15	o-xylene	1.001 ppm	-No-	268.2	sec
- Detected 15 peaks. Use + - to scroll [ 405 sec]					







TIME PRINTED: MAY 15,95 14:39

SAMPLE TIME: MAY 15,95 14:32

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.042 MVS	13.7
2	UNKNOWN	67.73 MVS	16.7
3	UNKNOWN	0.590 MVS	21.5
4	UNKNOWN	0.214 MVS	32.7
5	UNKNOWN	1.780 MVS	40.8
6	BENZENE	0.374 PPB	51.8
7	UNKNOWN	5.497 MVS	65.0
8	UNKNOWN	0.105 MVS	81.0
9	TOLUENE	1.837 PPB	103.8
10	UNKNOWN	1.726 MVS	195.0
11	ETHYLBENZENE	2.816 PPB	215.0
12	M,P-XYLENE	5.882 PPB	229.0

## NOTES

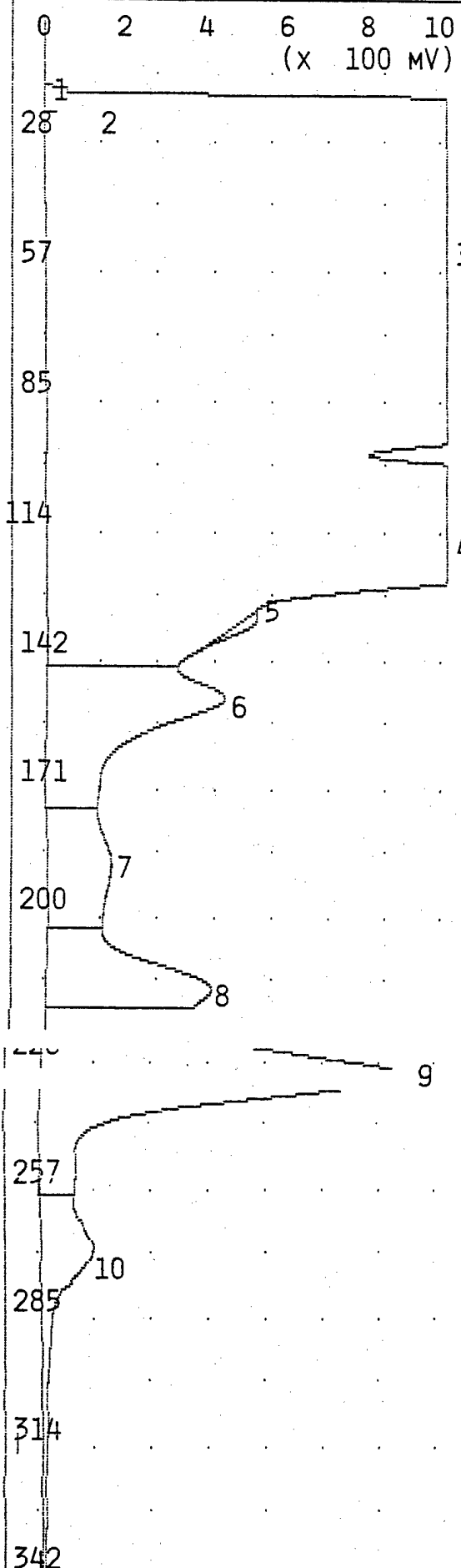
JOE BYRD, JR.

DULUTH ANGB

~~1 PPM BTEX~~

AIR BLANK 53

ANALYSIS #22 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 15,95 15:00  
SAMPLE TIME: MAY 15,95 14:54

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

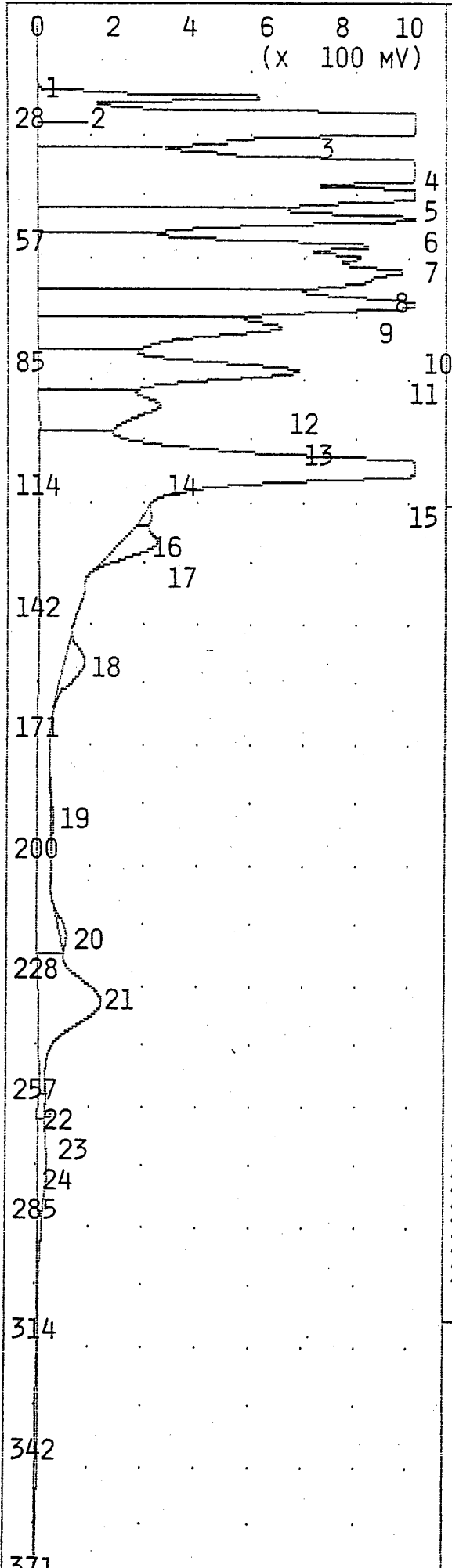
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.373 MVS	13.8
2	UNKNOWN	55.12 MVS	14.8
3	BENZENE	1160. PPM2	47.6
4	TOLUENE	52.51 PPM2	110.4
5	UNKNOWN	177.7 MVS	130.8
6	UNKNOWN	7.988 VSEC	149.2
7	UNKNOWN	3.961 VSEC	186.4
8	ETHYLBENZENE	5.104 PPM	214.0
9	M,P-XYLENE	41.04 PPM	229.6
10	O-XYLENE	22.70 PPM	268.0

PPM1 = ALARM 1 PPM2 = ALARM2

NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-002BH RESHOT  
5.0- 7.0 10G  
20 MICROLITER INJECTION



TIME PRINTED: MAY 15, 95 15:47

SAMPLE TIME: MAY 15, 95 15:41

## METHOD

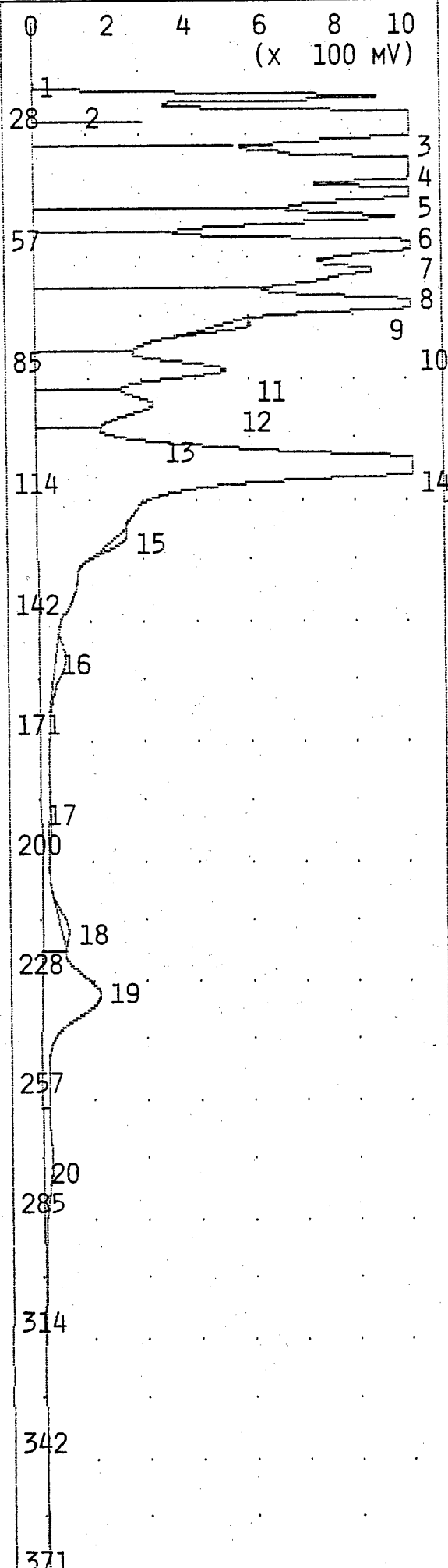
SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.119 MVS	13.8
2	UNKNOWN	4.945 MVS	14.8
3	UNKNOWN	1.234 VSEC	17.7
4	UNKNOWN	19.65 VSEC	23.9
5	UNKNOWN	12.70 VSEC	34.8
6	UNKNOWN	6.993 VSEC	40.4
7	UNKNOWN	4.180 VSEC	46.0
8	BENZENE	1.011 PPM	52.2
9	UNKNOWN	2.146 VSEC	55.1
10	UNKNOWN	5.807 VSEC	58.2
11	UNKNOWN	5.636 VSEC	66.0
12	UNKNOWN	3.708 VSEC	71.4
13	UNKNOWN	4.322 VSEC	81.8
14	UNKNOWN	2.574 VSEC	89.8
15	TOLUENE	10.71 PPM	104.2
16	UNKNOWN	85.76 MVS	115.3
17	UNKNOWN	594.7 MVS	121.4
18	UNKNOWN	465.4 MVS	149.6
19	UNKNOWN	97.55 MVS	186.6
20	ETHYLBENZENE	135.1 PPB	214.8
21	M,P-XYLENE	7.808 PPM	230.2
22	UNKNOWN	0.019 MVS	252.8
23	UNKNOWN	134.7 MVS	257.0
24	O-XYLENE	5.188 PPM	269.6

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-002BH  
 10.0-12.0 10G  
 5 MICROLITER INJECTION



TIME PRINTED: MAY 15,95 16:03

SAMPLE TIME: MAY 15,95 15:57

## METHOD

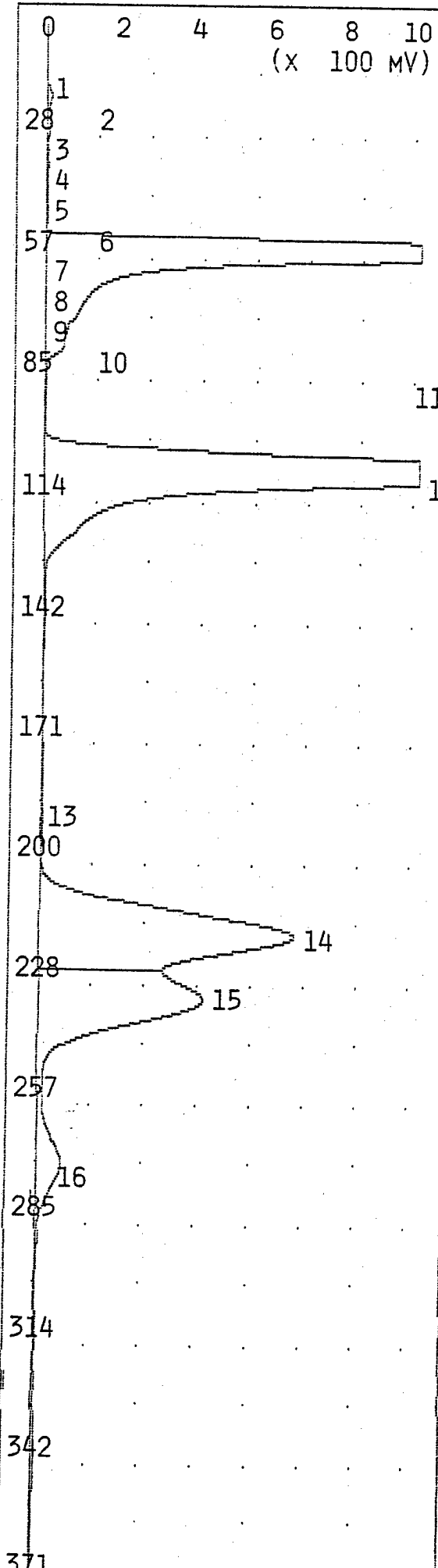
SLOPE UP	0.500	MV/SEC
SLOPE DOWN	1.500	MV/SEC
MIN AREA	0.000	MVSEC
MIN HEIGHT	0.000	MV
ANALYSIS DELAY	0.0	SEC
WINDOW PERCENT	10.0	%
DET FLOW	14	ML/MIN
B/F FLOW	14	ML/MIN
AUX FLOW	0	ML/MIN
OVEN TEMP	40	C
AMB TEMP	31	C
MAX GAIN	1000	
ANALYSIS TIME	400.0	SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.062 MVS	13.8
2	UNKNOWN	5.352 MVS	14.8
3	UNKNOWN	2.011 VSEC	17.8
4	UNKNOWN	22.01 VSEC	24.2
5	UNKNOWN	11.79 VSEC	34.7
6	UNKNOWN	6.533 VSEC	40.4
7	UNKNOWN	3.705 VSEC	46.1
8	BENZENE	3.685 PPM	52.5
9	UNKNOWN	5.181 VSEC	58.2
10	UNKNOWN	9.488 VSEC	66.2
11	UNKNOWN	181.3 MVS	71.2
12	UNKNOWN	3.222 VSEC	81.7
13	UNKNOWN	2.352 VSEC	89.8
14	TOLUENE	10.45 PPM	104.2
15	UNKNOWN	143.5 MVS	120.4
16	UNKNOWN	215.5 MVS	149.6
17	UNKNOWN	42.78 MVS	186.8
18	ETHYLBENZENE	167.7 PPB	214.8
19	M,P-XYLENE	7.234 PPM	230.0
20	O-XYLENE	4.654 PPM	269.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-002BH RE-RESHOT  
5.0- 7.0 10G  
5 MICROLITER INJECTION



TIME PRINTED: MAY 15,95 16:44

SAMPLE TIME: MAY 15,95 16:38

## METHOD

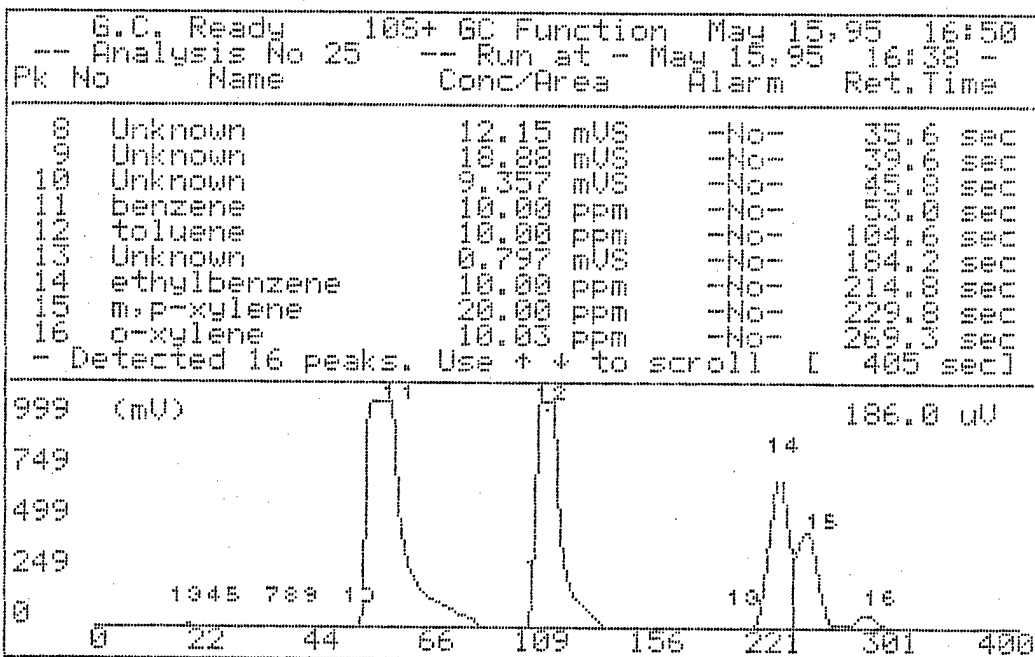
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

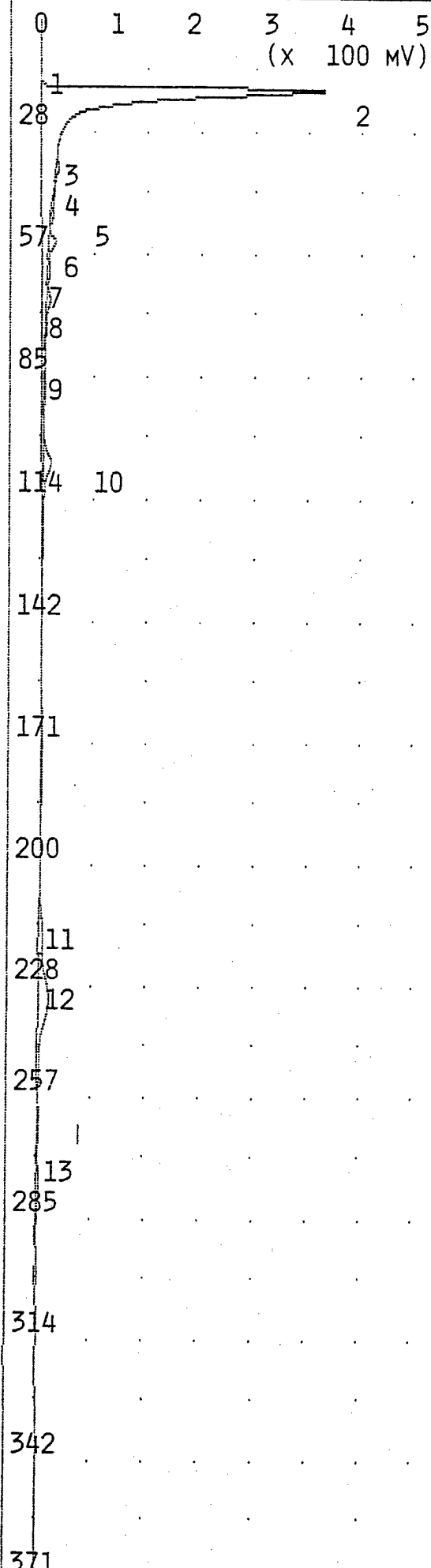
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.030 MVS	13.7
2	UNKNOWN	10.39 MVS	15.3
3	UNKNOWN	55.41 MVS	16.7
4	UNKNOWN	43.66 MVS	21.8
5	UNKNOWN	0.439 MVS	23.7
6	UNKNOWN	35.54 MVS	25.6
7	UNKNOWN	18.13 MVS	33.0
8	UNKNOWN	12.13 MVS	35.6
9	UNKNOWN	18.84 MVS	39.6
10	UNKNOWN	9.326 MVS	45.8
11	BENZENE	9.052 PPM	53.0
12	TOLUENE	8.789 PPM	104.6
13	UNKNOWN	0.797 MVS	184.2
14	ETHYLBENZENE	8.293 PPM	214.8
15	M,P-XYLENE	16.84 PPM	229.8
16	O-XYLENE	8.391 PPM	269.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
10 PPM BTEX





TIME PRINTED: MAY 15,95 16:58

SAMPLE TIME: MAY 15,95 16:52

## METHOD

SLOPE UP	0.500	MV/SEC
SLOPE DOWN	1.500	MV/SEC
MIN AREA	0.000	MVSEC
MIN HEIGHT	0.000	MV
ANALYSIS DELAY	0.0	SEC
WINDOW PERCENT	10.0	%
DET FLOW	14	ML/MIN
B/F FLOW	14	ML/MIN
AUX FLOW	0	ML/MIN
OVEN TEMP	40	C
AMB TEMP	31	C
MAX GAIN	1000	
ANALYSIS TIME	400.0	SEC

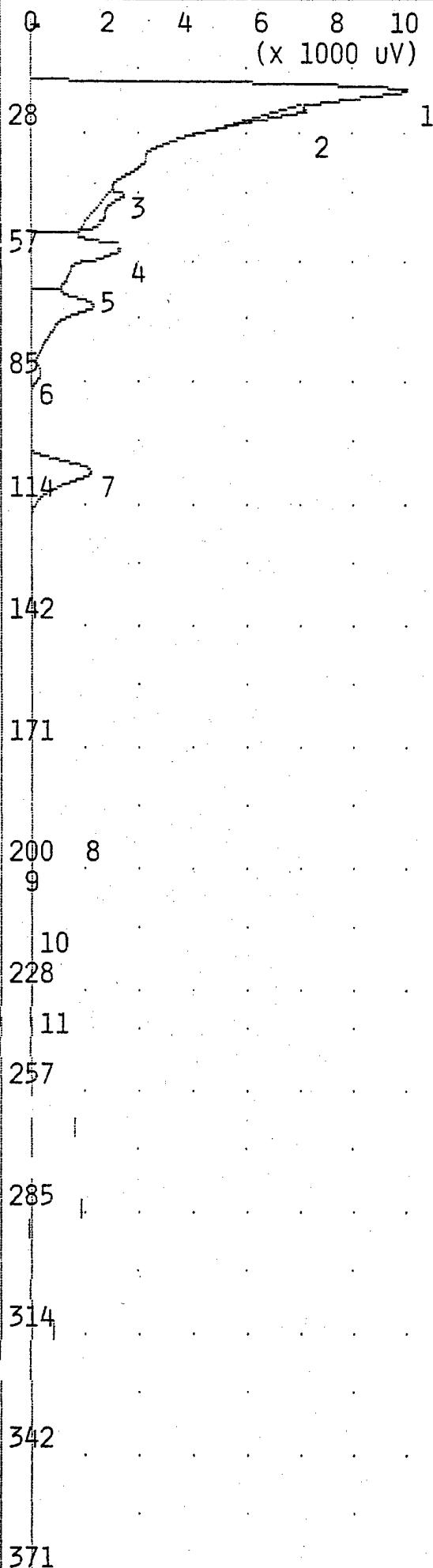
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.046 MVS	13.5
2	UNKNOWN	2.393 VSEC	16.6
3	UNKNOWN	11.94 MVS	34.8
4	UNKNOWN	1.233 MVS	39.5
5	UNKNOWN	6.099 MVS	45.6
6	BENZENE	11.05 PPB	52.0
7	UNKNOWN	8.683 MVS	58.0
8	UNKNOWN	21.30 MVS	65.8
9	UNKNOWN	2.818 MVS	81.6
10	TOLUENE	37.93 PPB	103.7
11	ETHYLBENZENE	40.74 PPB	214.4
12	M,P-XYLENE	521.2 PPB	229.6
13	O-XYLENE	103.4 PPB	269.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

## ANALYTIC #27 10S+ GC FUNCTION ANALYSIS REPORT

TIME PRINTED: MAY 15,95 17:09  
SAMPLE TIME: MAY 15,95 17:02

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 14 ML/MIN  
B/F FLOW 14 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 400.0 SEC

## PEAK REPORT

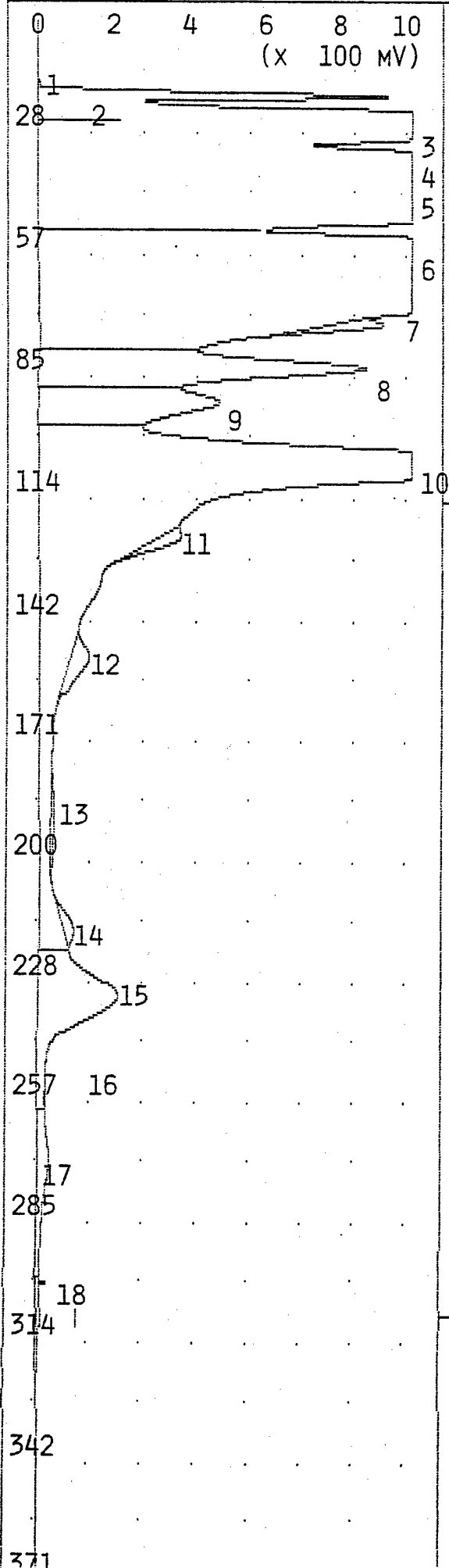
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	153.8 MVS	17.0
2	UNKNOWN	1.587 MVS	21.6
3	UNKNOWN	3.106 MVS	41.1
4	BENZENE	10.19 PPB	52.6
5	UNKNOWN	20.02 MVS	66.4
6	UNKNOWN	7.491 MVS	81.2
7	TOLUENE	13.63 PPB	104.9
8	UNKNOWN	0.142 MVS	190.4
9	UNKNOWN	0.037 MVS	193.4
10	ETHYLBENZENE	3.794 PPB	216.0
11	M,P-XYLENE	12.62 PPB	231.2

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK  
400 MICROLITER INJECTON



## ANALYSIS #29 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 15,95 17:30  
 SAMPLE TIME: MAY 15,95 17:23

## METHOD

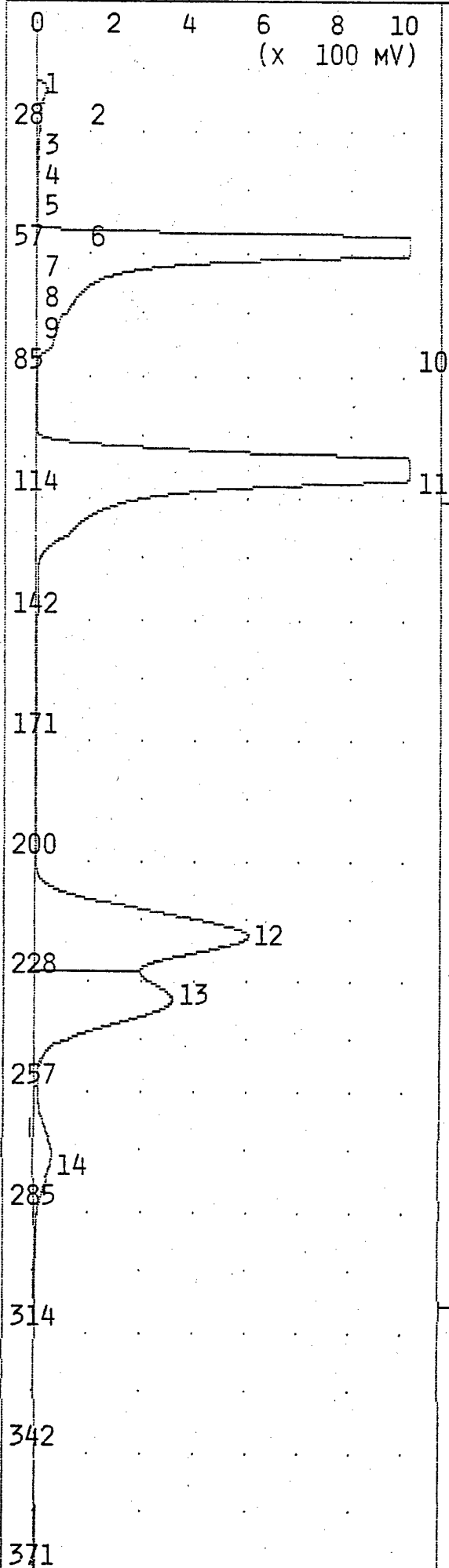
SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.057 MVS	13.8
2	UNKNOWN	6.434 MVS	14.8
3	UNKNOWN	1.929 VSEC	17.8
4	UNKNOWN	26.95 VSEC	21.4
5	UNKNOWN	48.52 VSEC	39.3
6	UNKNOWN	116.5 VSEC	58.4
7	UNKNOWN	443.8 MVS	71.3
8	UNKNOWN	5.656 VSEC	81.6
9	UNKNOWN	3.681 VSEC	89.6
10	TOLUENE	18.38 PPM	104.4
11	UNKNOWN	305.1 MVS	120.5
12	UNKNOWN	459.0 MVS	149.4
13	UNKNOWN	110.6 MVS	186.2
14	ETHYLBENZENE	198.0 PPB	214.4
15	M,P-XYLENE	11.62 PPM	229.4
16	UNKNOWN	1.110 MVS	251.2
17	O-XYLENE	5.414 PPM	268.8
18	UNKNOWN	306.8 MVS	298.4

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-001BH  
 5.0- 7.0 3G  
 10 MICROLITER INJECTION



TIME PRINTED: MAY 15,95 17:43

SAMPLE TIME: MAY 15,95 17:36

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 14 ML/MIN  
 B/F FLOW 14 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 400.0 SEC

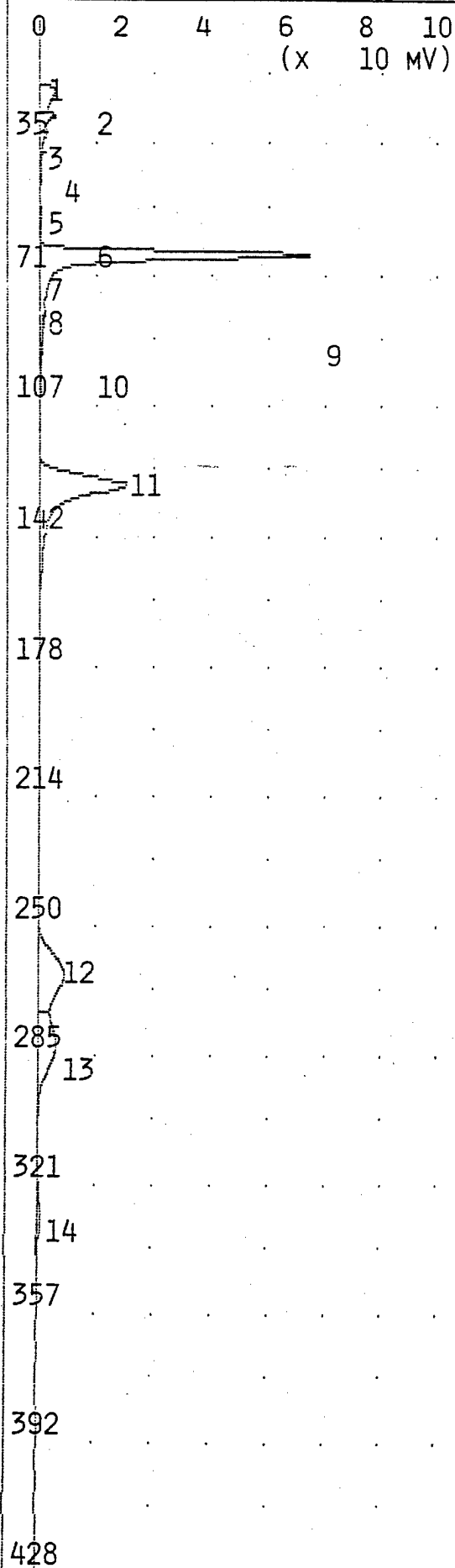
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.037 MVS	13.5
2	UNKNOWN	26.19 MVS	15.4
3	UNKNOWN	266.1 MVS	16.8
4	UNKNOWN	5.603 MVS	21.8
5	UNKNOWN	0.872 MVS	25.7
6	UNKNOWN	3.337 MVS	33.1
7	UNKNOWN	1.531 MVS	35.8
8	UNKNOWN	2.619 MVS	40.5
9	UNKNOWN	1.366 MVS	45.8
10	BENZENE	10.94 PPM	53.4
11	TOLUENE	9.802 PPM	105.3
12	ETHYLBENZENE	8.544 PPM	215.8
13	M,P-XYLENE	16.56 PPM	230.8
14	O-XYLENE	7.747 PPM	270.4

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 10 PPM BTEX

\* ANALYSIS #1 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 16,95 08:11  
SAMPLE TIME: MAY 16,95 08:03

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 28 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

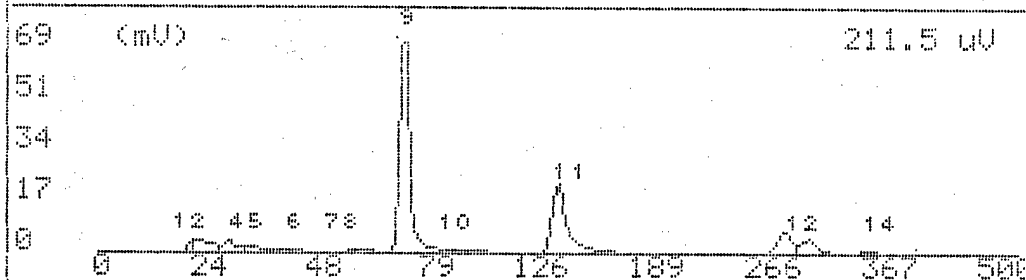
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.081 MVS	16.3
2	UNKNOWN	5.752 MVS	18.5
3	UNKNOWN	18.19 MVS	20.0
4	UNKNOWN	14.28 MVS	26.2
5	UNKNOWN	10.32 MVS	31.0
6	UNKNOWN	4.422 MVS	39.4
7	UNKNOWN	1.263 MVS	47.4
8	UNKNOWN	4.876 MVS	51.4
9	UNKNOWN	243.3 MVS	63.3
10	UNKNOWN	0.726 MVS	79.6
11	UNKNOWN	167.5 MVS	126.2
12	UNKNOWN	98.87 MVS	260.8
13	UNKNOWN	76.18 MVS	280.2
14	UNKNOWN	16.68 MVS	329.3

NOTES

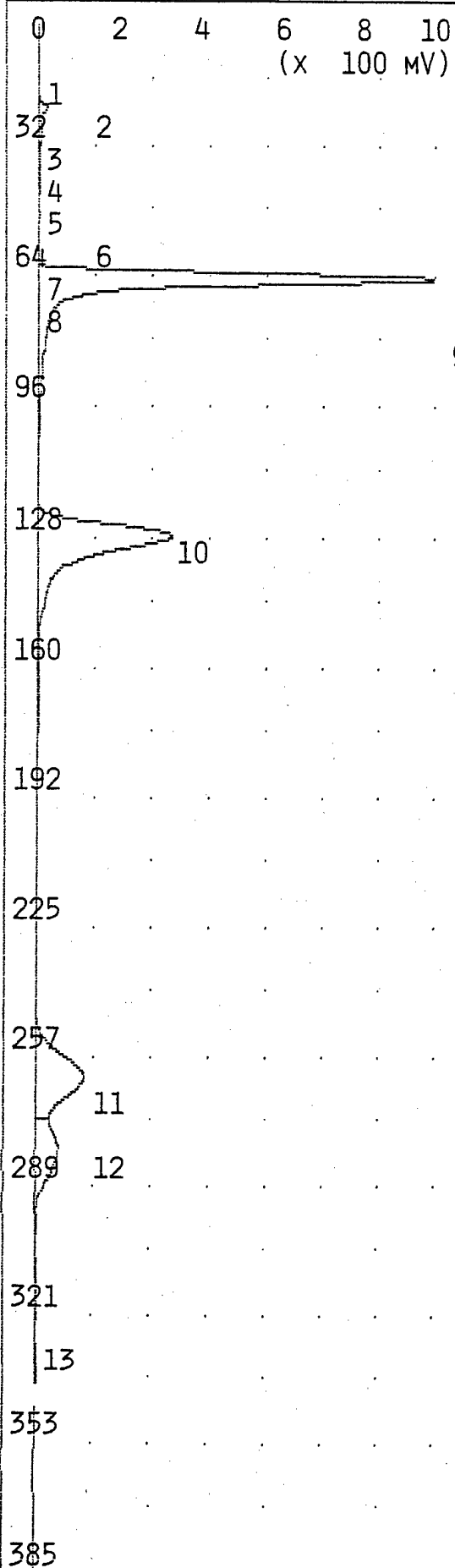
JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

G.C. Ready		108+ GC Function		May 16, 95 08:18	
-- Analysis No 1		-- Run at -		May 16, 95 08:03 -	
Pk No	Name	Conc/Area	Alarm	Ret. Time	
6	Unknown	4.422 mUS	-No-	39.4 sec	
7	Unknown	1.263 mUS	-No-	47.4 sec	
8	Unknown	4.876 mUS	-No-	51.4 sec	
9	benzene	100.0 ppb	-No-	63.3 sec	
10	Unknown	0.726 mUS	-No-	79.6 sec	
11	toluene	100.0 ppb	-No-	126.2 sec	
12	ethylbenzene	100.0 ppb	-No-	260.8 sec	
13	m,p-xylene	200.0 ppb	-No-	280.2 sec	
14	o-xylene	100.0 ppb	-No-	329.3 sec	
- Detected 14 peaks. Use + + to scroll					[ 505 sec]



## ANALYSIS #2

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 16,95 08:28

SAMPLE TIME: MAY 16,95 08:20

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 11 ML/MIN  
 B/F FLOW 11 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 29 C  
 MAX GAIN 1000  
 ANALYSIS TIME 450.0 SEC

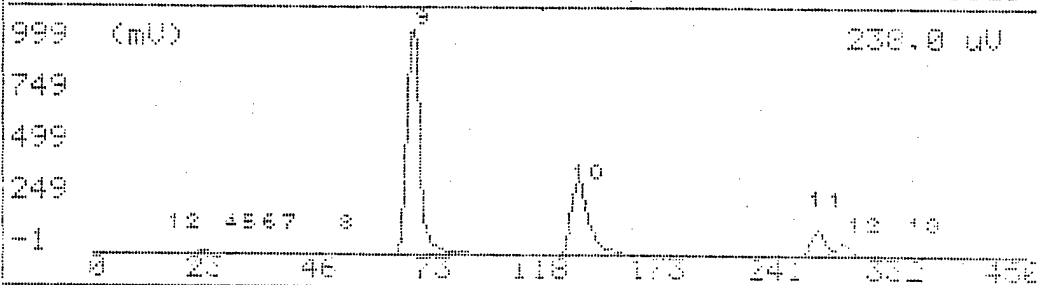
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.046 MVS	16.4
2	UNKNOWN	7.395 MVS	18.4
3	UNKNOWN	83.33 MVS	20.3
4	UNKNOWN	64.17 MVS	26.4
5	UNKNOWN	0.337 MVS	30.9
6	UNKNOWN	42.69 MVS	35.6
7	UNKNOWN	0.630 MVS	39.6
8	UNKNOWN	36.11 MVS	47.5
9	BENZENE	1.763 PPM	62.9
10	TOLUENE	1.857 PPM	126.0
11	ETHYLBENZENE	1.583 PPM	260.0
12	M,P-XYLENE	2.249 PPM	278.9
13	O-XYLENE	814.9 PPB	325.0

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 1 PPM BTEX

B.C. Ready		100+ GC Function		May 16, 95	08:03
-- Analysis No 1		-- Run at --		May 16, 95	08:20
Pk No	Name	Conc./Area	Alarm	Ret. Time	
5	Unknown	0.337 mV	-No-	3.000	
6	Unknown	42.72 mV	-No-	3.000	
7	Unknown	0.330 mV	-No-	3.000	
8	Unknown	36.16 mV	-No-	3.000	
9	benzene	1.000 ppm	-No-	3.000	
10	toluene	1.000 ppm	-No-	3.000	
11	ethylbenzene	1.000 ppm	-No-	3.000	
12	m,p-xylene	2.001 ppm	-No-	3.000	
13	o-xylene	1.012 ppm	-No-	3.000	
- Detected 13 peaks. Use + + to scroll [ 45.5 sec]					



## ANALYSIS #3

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 100 MV)

TIME PRINTED: MAY 16,95 08:42

SAMPLE TIME: MAY 16,95 08:34

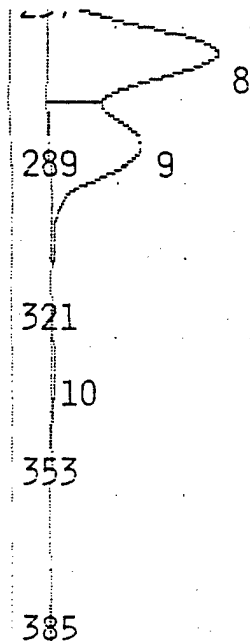
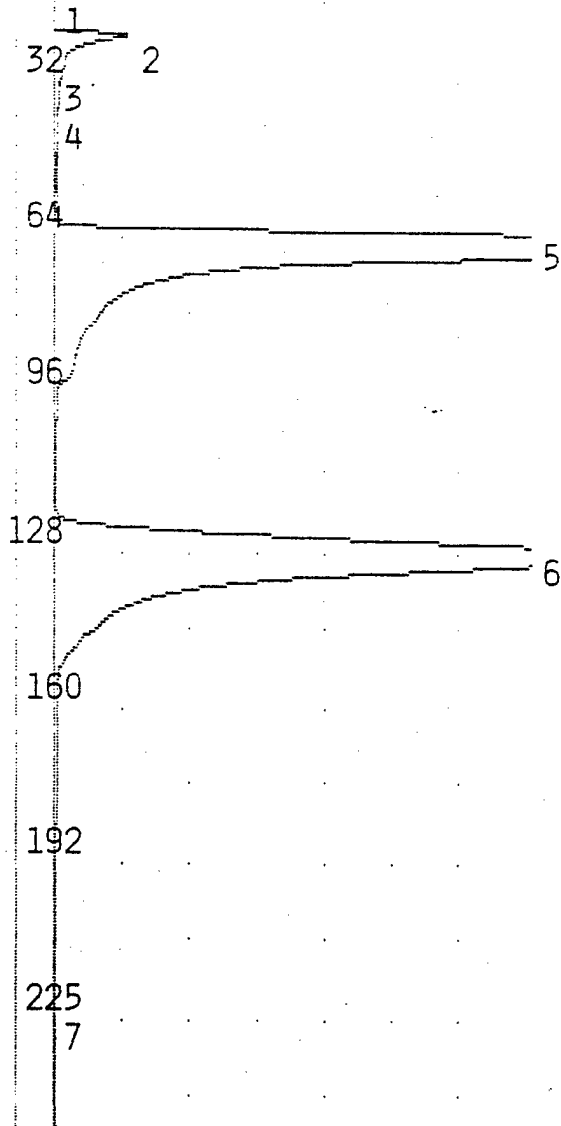
## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000

ANALYSIS TIME 450.0 SEC

## PEAK REPORT

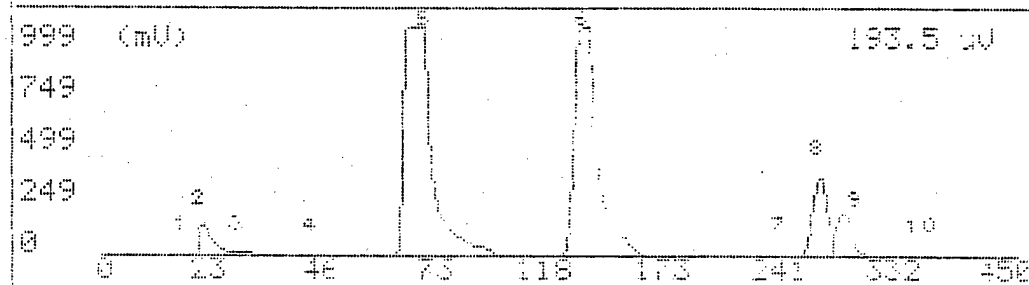
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.033 MVS	16.2
2	UNKNOWN	773.4 MVS	20.1
3	UNKNOWN	2.087 MVS	26.0
4	UNKNOWN	3.702 MVS	42.2
5	BENZENE	3.714 PPM	63.1
6	TOLUENE	4.081 PPM	126.9
7	UNKNOWN	2.221 MVS	224.0
8	ETHYLBENZENE	3.060 PPM	261.0
9	M,P-XYLENE	6.604 PPM	279.4
10	O-XYLENE	2.210 PPM	326.4



## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
10 PPM BTEX

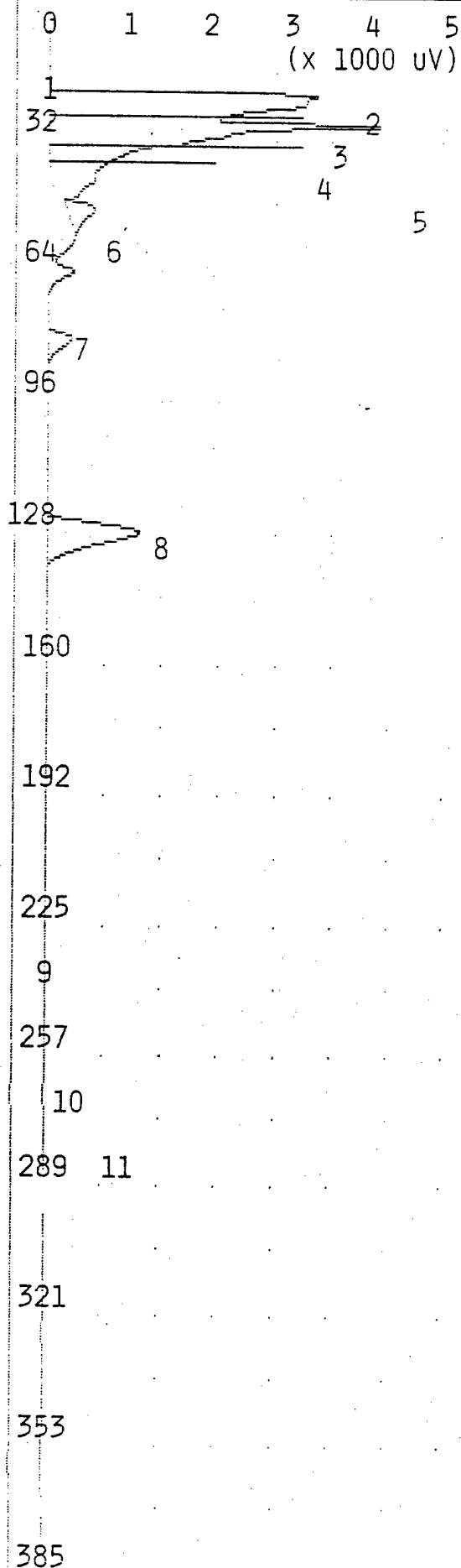
G.C. Ready		100+ GC Function		Ma. 16	15.148
-- Analysis No. 1		-- Run at --		May 10.95	381.1
Pk No	Name	Conc/Area	Alarm	Set	Time
2	Unknown	773.6	NO	25.1	900
3	Unknown	2.087	NO	26.1	900
4	Unknown	3.702	NO	40.1	900
5	benzene	10.00	NO	40.1	900
6	toluene	10.00	NO	40.1	900
7	Unknown	2.221	NO	44.1	900
8	ethylbenzene	10.00	NO	44.1	900
9	m,p-xylene	29.01	NO	44.1	900
10	o-xylene	10.00	NO	44.1	900
- Detected 10 peaks. Use + + to scroll [					





## ANALYSIS #4

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 16,95 08:58

SAMPLE TIME: MAY 16,95 08:50

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000

ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.024 MVS	16.2
2	UNKNOWN	5.093 MVS	18.5
3	UNKNOWN	4.879 MVS	19.9
4	UNKNOWN	11.66 MVS	21.2
5	UNKNOWN	24.61 MVS	26.2
6	UNKNOWN	1.683 MVS	47.2
7	UNKNOWN	2.792 MVS	79.2
8	TOLUENE	9.145 PPB	126.2
9	UNKNOWN	2.044 MVS	233.4
10	ETHYLBENZENE	5.341 PPB	261.6
11	M,P-XYLENE	5.740 PPB	280.0

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

0 2 4 6 8 10  
(x 1000 UV)

TIME PRINTED: MAY 16,95 09:31

SAMPLE TIME: MAY 16,95 09:23

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

## PEAK REPORT

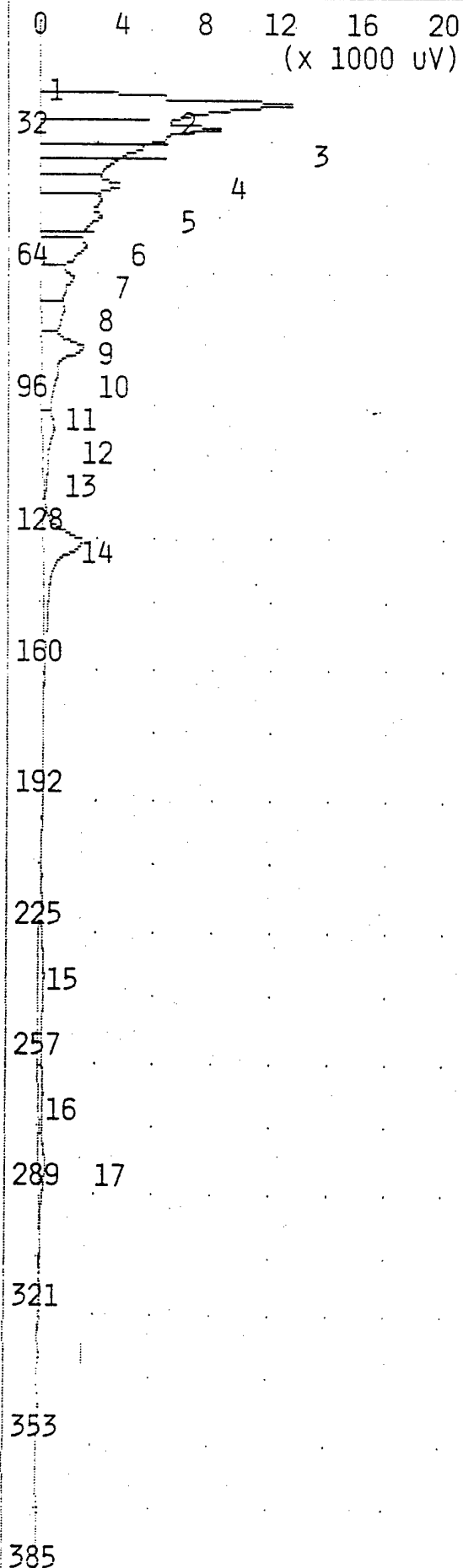
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.034 MVS	16.4
2	UNKNOWN	9.450 MVS	18.4
3	UNKNOWN	35.21 MVS	20.4
4	UNKNOWN	47.42 MVS	26.4
5	UNKNOWN	14.86 MVS	47.4
6	BENZENE	2.024 PPB	63.4
7	UNKNOWN	3.477 MVS	79.4
8	UNKNOWN	0.332 MVS	115.4
9	TOLUENE	5.726 PPB	127.4
10	UNKNOWN	1.940 MVS	235.6
11	ETHYLBENZENE	1.140 PPB	264.8
12	M,P-XYLENE	3.136 PPB	282.9

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-007BH

0.5- 2.5 10G

1  
32  
64  
96  
128  
160  
192  
225  
257  
289  
321  
353  
385  
417



TIME PRINTED: MAY 16,95 09:42

SAMPLE TIME: MAY 16,95 09:35

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 11 ML/MIN  
 B/F FLOW 11 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 31 C  
 MAX GAIN 1000  
 ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.030 MVS	14.4
2	UNKNOWN	8.287 MVS	18.7
3	UNKNOWN	55.67 MVS	20.9
4	UNKNOWN	23.76 MVS	26.8
5	UNKNOWN	44.73 MVS	29.3
6	UNKNOWN	15.75 MVS	40.8
7	UNKNOWN	11.21 MVS	44.5
8	UNKNOWN	18.55 MVS	48.4
9	UNKNOWN	12.59 MVS	55.8
10	BENZENE	4.591 PPB	63.0
11	UNKNOWN	7.745 MVS	70.8
12	UNKNOWN	18.79 MVS	80.0
13	UNKNOWN	7.600 MVS	100.1
14	TOLUENE	12.05 PPB	127.6
15	UNKNOWN	11.62 MVS	229.2
16	ETHYLBENZENE	4.553 PPB	263.7
17	M,P-XYLENE	13.86 PPB	280.8

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 025-007BH  
 5.0- 7.0 10G

## ANALYSIS #7

## 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 16,95 09:53

SAMPLE TIME: MAY 16,95 09:46

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	8.202 MVS	18.8
2	UNKNOWN	52.16 MVS	20.6
3	UNKNOWN	78.47 MVS	26.8
4	UNKNOWN	0.281 MVS	40.2
5	UNKNOWN	1.207 MVS	45.6
6	UNKNOWN	27.46 MVS	48.0
7	BENZENE	3.721 PPB	63.5
8	UNKNOWN	6.346 MVS	79.6
9	TOLUENE	3.690 PPB	127.2
10	UNKNOWN	4.395 MVS	230.4
11	ETHYLBENZENE	0.293 PPB	263.7

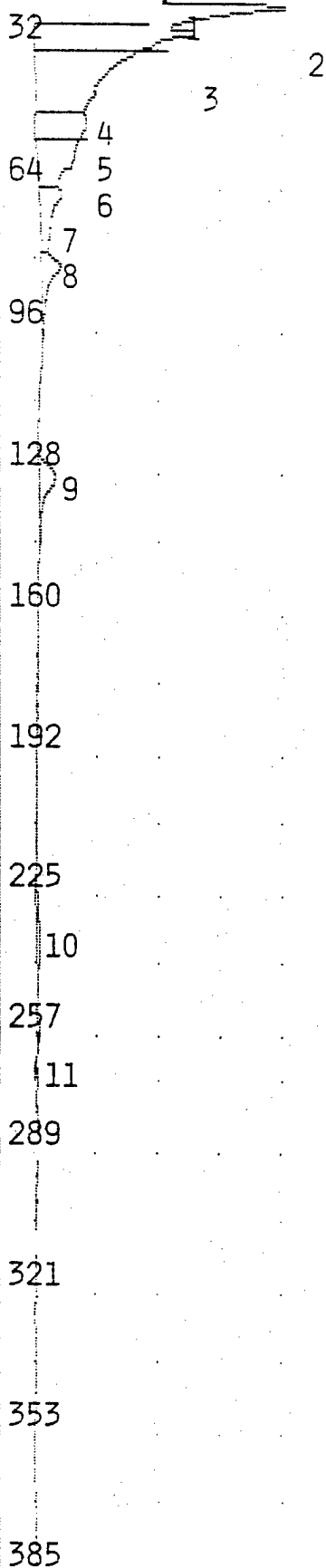
## NOTES

JOE BYRD, JR.

DULUTH ANGB

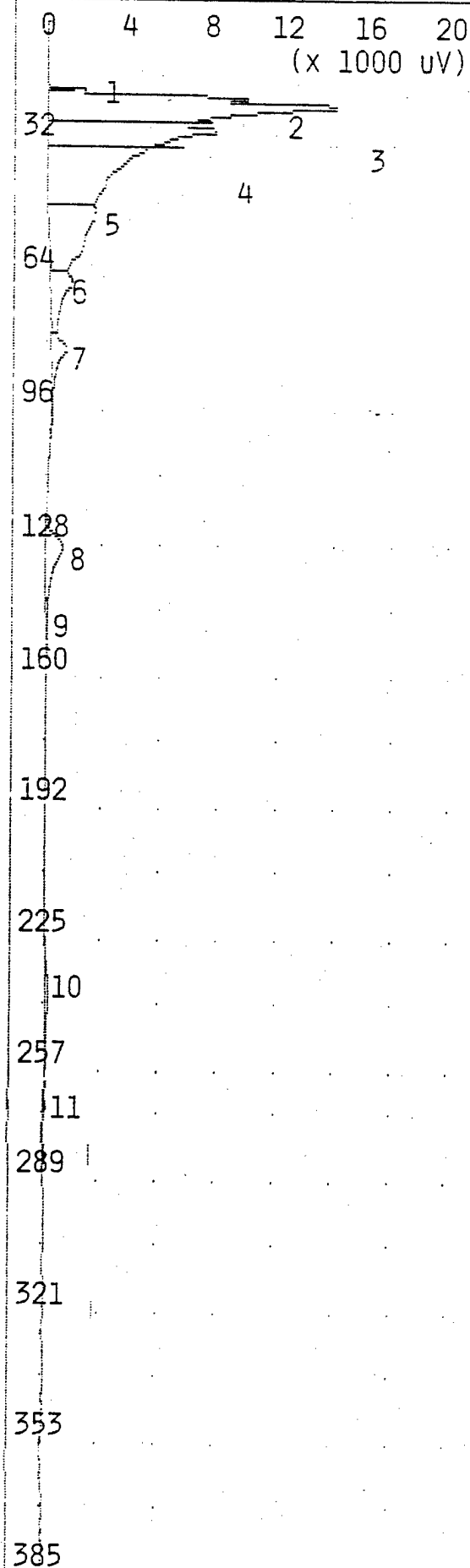
025-007BH

10.0-12.0 10G



ANALYSIS #8

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 16,95 10:04

SAMPLE TIME: MAY 16,95 09:57

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	2.406 MVS	17.0
2	UNKNOWN	14.70 MVS	18.6
3	UNKNOWN	61.47 MVS	20.5
4	UNKNOWN	84.91 MVS	26.6
5	UNKNOWN	28.43 MVS	45.9
6	BENZENE	3.892 PPB	63.5
7	UNKNOWN	5.966 MVS	79.3
8	TOLUENE	10.87 PPB	126.9
9	UNKNOWN	8.209 MVS	140.9
10	UNKNOWN	3.239 MVS	234.6
11	ETHYLBENZENE	1.220 PPB	266.6

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-007BH  
15.0-17.0 10G

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 16,95 10:15

SAMPLE TIME: MAY 16,95 10:08

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	1.758 MVS	17.0
2	UNKNOWN	14.10 MVS	18.6
3	UNKNOWN	46.77 MVS	20.7
4	UNKNOWN	96.10 MVS	26.6
5	UNKNOWN	0.429 MVS	31.6
6	UNKNOWN	1.834 MVS	45.7
7	BENZENE	0.073 PPB	63.1
8	UNKNOWN	4.684 MVS	80.1
9	TOLUENE	3.829 PPB	127.2
10	UNKNOWN	2.850 MVS	232.4
11	ETHYLBENZENE	0.917 PPB	266.6
12	O-XYLENE	20.52 PPB	354.0
13	UNKNOWN	6.573 MVS	408.3

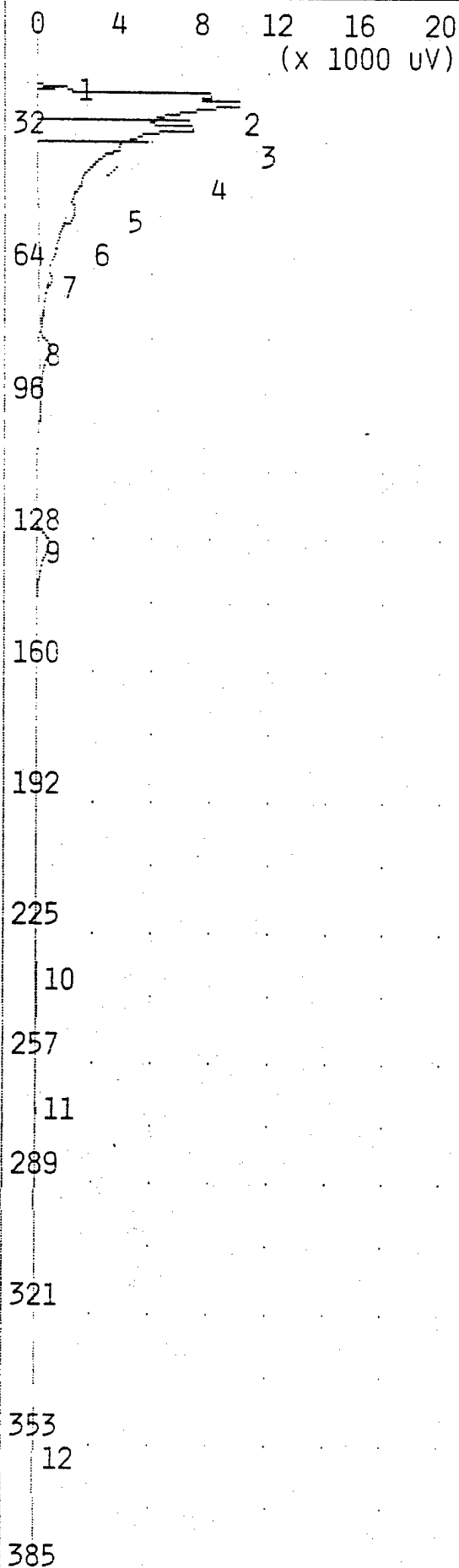
## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-007BH

20.0-22.0 10G



## ANALYSIS #10

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 16,95 10:26

SAMPLE TIME: MAY 16,95 10:19

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

## PEAK REPORT

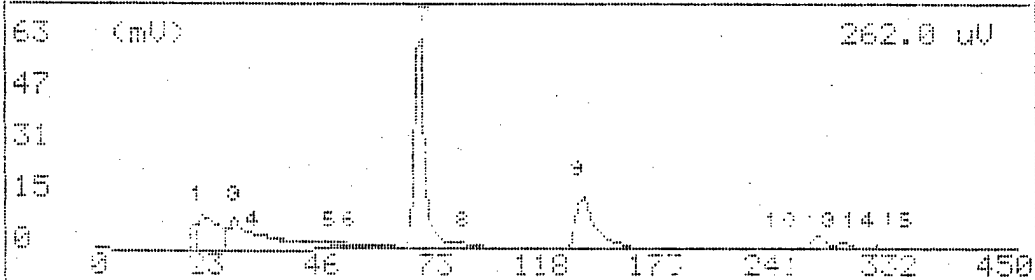
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	10.44 MVS	18.8
2	UNKNOWN	44.21 MVS	20.6
3	UNKNOWN	91.00 MVS	27.0
4	UNKNOWN	0.303 MVS	32.0
5	UNKNOWN	0.032 MVS	45.8
6	UNKNOWN	1.332 MVS	47.6
7	BENZENE	101.2 PPB	63.8
8	UNKNOWN	1.176 MVS	80.0
9	TOLUENE	82.93 PPB	127.8
10	UNKNOWN	0.119 MVS	229.0
11	UNKNOWN	0.557 MVS	236.0
12	UNKNOWN	1.248 MVS	239.0
13	ETHYLBENZENE	53.62 PPB	263.4
14	M,P-XYLENE	74.61 PPB	283.2
15	O-XYLENE	0.577 PPB	309.6

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

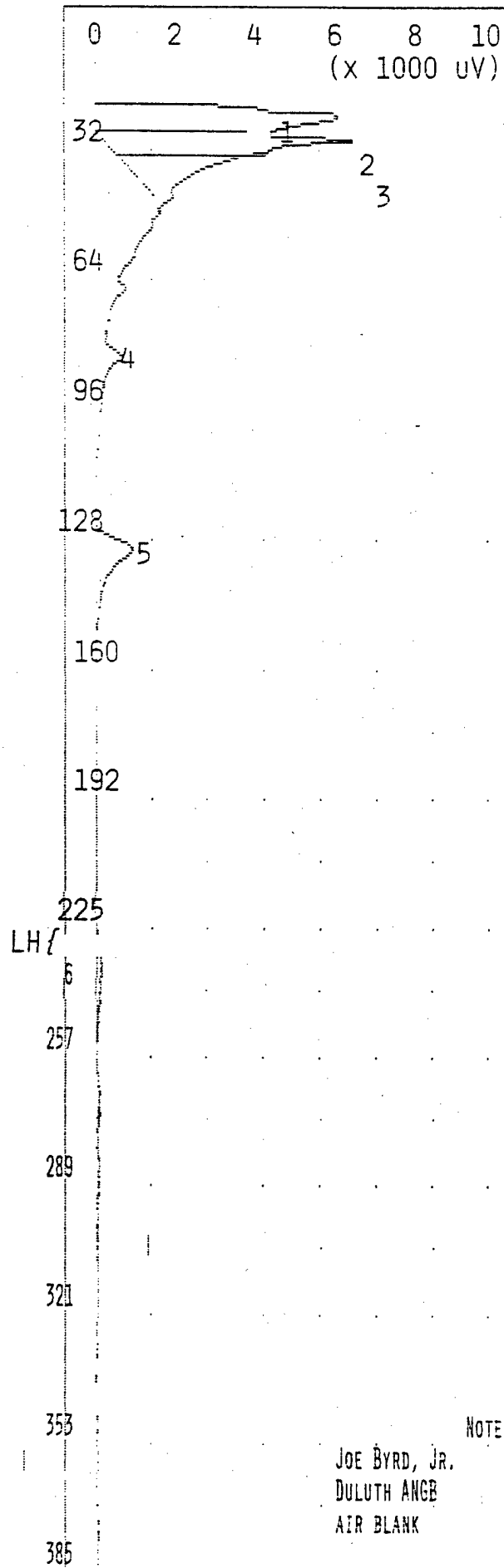
LH

S.C. Ready 105- GC Function Mar 13, 98 10:31					
-- Analysis No 10 -- Run at - Mar 13, 98 10:19 -					
Pk No	Name	Conc/Area	Alert	Ret. Time	
7	benzene	100.0 ppb	-No-	60.0	sec
8	Unknown	1.176 mV	-No-	60.0	sec
9	toluene	100.0 ppb	-No-	103.0	sec
10	Unknown	0.119 mV	-No-	104.0	sec
11	Unknown	0.557 mV	-No-	105.0	sec
12	Unknown	1.248 mV	-No-	106.0	sec
13	ethylbenzene	100.0 ppb	-No-	107.4	sec
14	m,p-xylene	200.0 ppb	-No-	108.2	sec
15	o-xylene	100.0 ppb	-No-	109.0	sec
- Detected 15 peaks. Use ++ to scroll [ 400 sec]					





# ANALYSIS #11 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 16,95 10:40

SAMPLE TIME: MAY 16,95 10:33

## METHOD

SLOPE UP 1.500 MV/SEC  
 SLOPE DOWN 4.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 11 ML/MIN  
 B/F FLOW 11 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 32 C  
 MAX GAIN 1000

ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	5.396 MVS	19.3
2	UNKNOWN	30.84 MVS	21.4
3	UNKNOWN	32.57 MVS	27.6
4	UNKNOWN	2.044 MVS	81.7
5	TOLUENE	5.320 PPB	128.8
6	UNKNOWN	1.942 MVS	234.2

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 AIR BLANK

## ANALYTIC #12 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 1000 uV)

TIME PRINTED: MAY 16,95 10:52

SAMPLE TIME: MAY 16,95 10:44

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.124 MVS	17.0
2	UNKNOWN	12.16 MVS	18.9
3	UNKNOWN	42.08 MVS	21.2
4	UNKNOWN	50.33 MVS	27.0
5	UNKNOWN	9.365 MVS	41.1
6	UNKNOWN	4.525 MVS	45.6
7	UNKNOWN	15.22 MVS	48.2
8	BENZENE	2.218 PPB	64.4
9	UNKNOWN	4.415 MVS	80.2
10	TOLUENE	3.665 PPB	127.7
11	UNKNOWN	2.179 MVS	233.4
12	ETHYLBENZENE	0.108 PPB	261.0
13	M,P-XYLENE	8.921 PPB	285.6

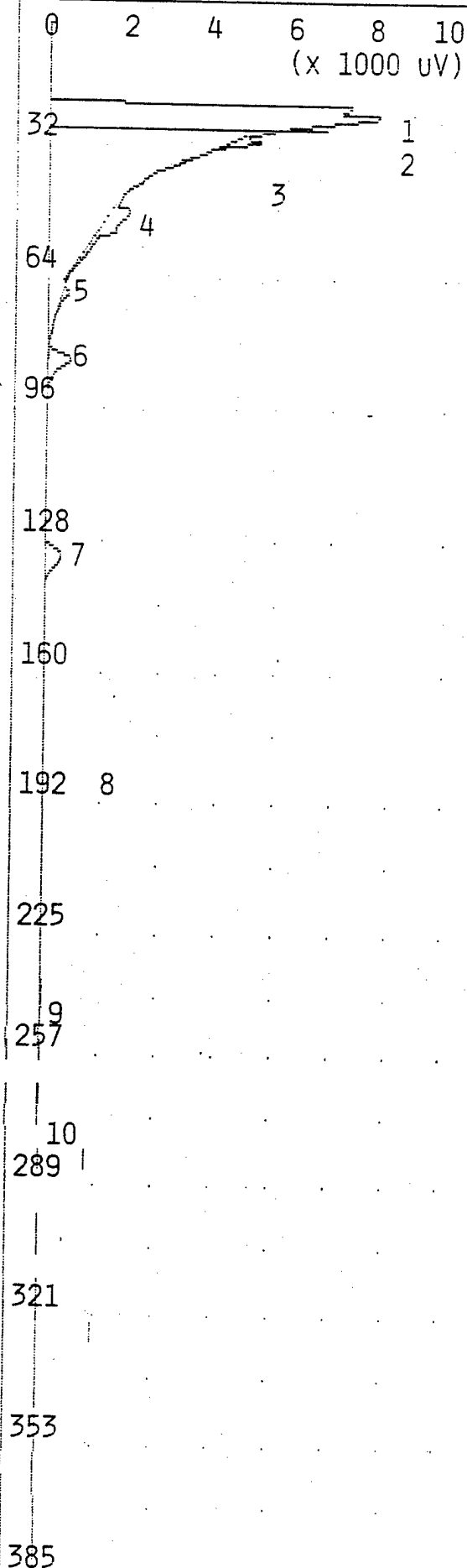
## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-005BH

0.5- 2.5 10G

## ANALYSIS #13

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 16,95 11:03  
SAMPLE TIME: MAY 16,95 10:55

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	12.46 MVS	20.4
2	UNKNOWN	131.2 MVS	22.5
3	UNKNOWN	0.901 MVS	29.0
4	UNKNOWN	3.375 MVS	46.0
5	BENZENE	0.146 PPB	66.6
6	UNKNOWN	2.614 MVS	82.6
7	TOLUENE	3.560 PPB	129.6
8	UNKNOWN	31.51 MVS	185.4
9	UNKNOWN	16.89 MVS	237.6
10	ETHYLBENZENE	2.280 PPB	272.0

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-005BH  
10.0-12.0

10G

0 4 8 12 16 20  
(x 1000 uV)

TIME PRINTED: MAY 16,95 11:13

SAMPLE TIME: MAY 16,95 11:06

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

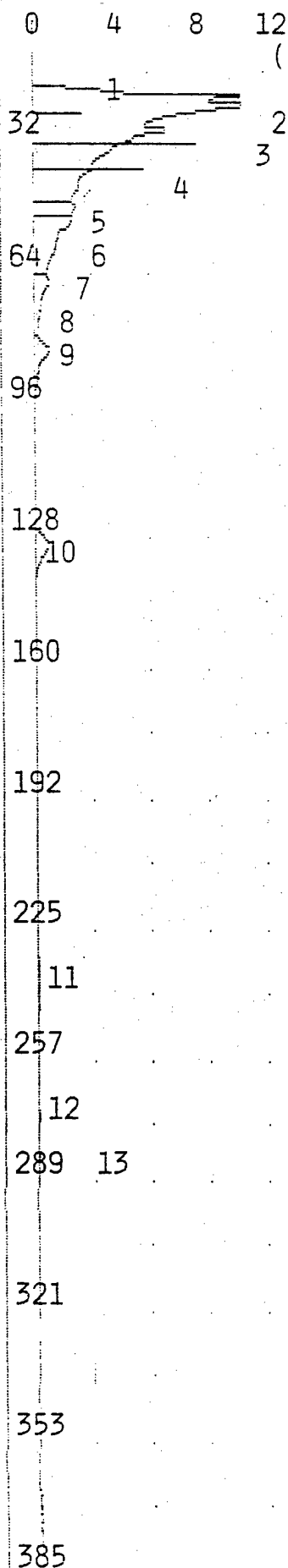
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	3.842 MVS	17.5
2	UNKNOWN	16.93 MVS	19.0
3	UNKNOWN	49.84 MVS	21.4
4	UNKNOWN	66.94 MVS	27.4
5	UNKNOWN	0.246 MVS	36.9
6	UNKNOWN	6.842 MVS	45.9
7	UNKNOWN	17.36 MVS	48.7
8	BENZENE	2.509 PPB	64.0
9	UNKNOWN	5.014 MVS	80.6
10	TOLUENE	4.305 PPB	128.0
11	UNKNOWN	3.062 MVS	235.2
12	ETHYLBENZENE	0.934 PPB	267.4
13	M,P-XYLENE	8.781 PPB	281.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-005BH  
20.0-22.0

10G



ANALYSIS #15

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 1000 UV)

TIME PRINTED: MAY 16, 95 11:49

SAMPLE TIME: MAY 16, 95 11:42

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

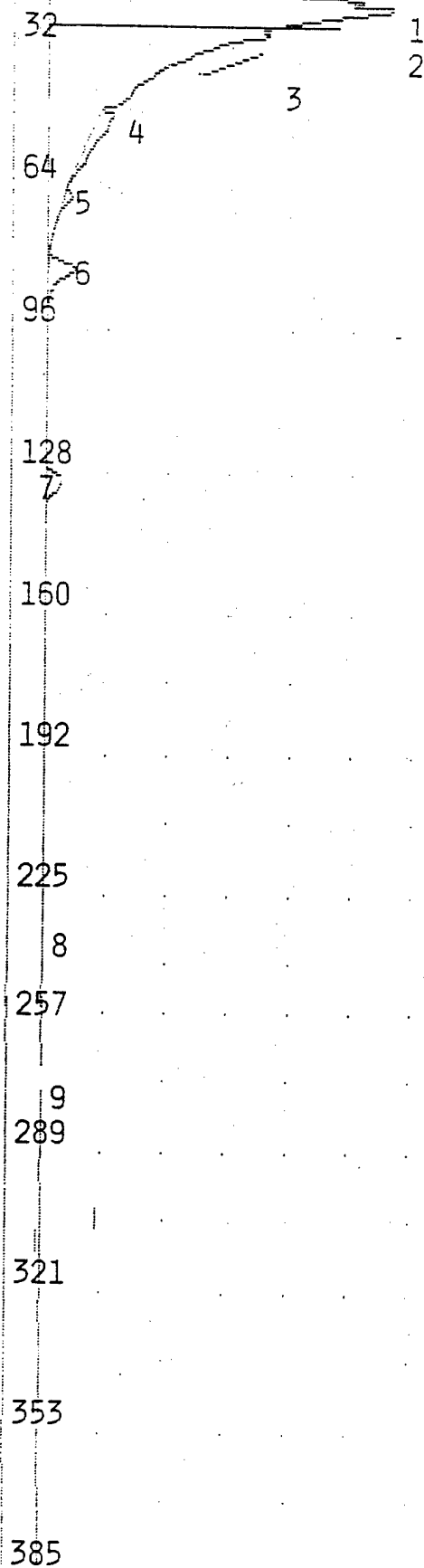
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	11.13 MVS	19.2
2	UNKNOWN	124.8 MVS	21.2
3	UNKNOWN	0.611 MVS	27.4
4	UNKNOWN	2.818 MVS	45.8
5	BENZENE	0.068 PPB	63.2
6	UNKNOWN	2.953 MVS	80.6
7	TOLUENE	3.688 PPB	128.5
8	UNKNOWN	2.329 MVS	235.4
9	ETHYLBENZENE	0.387 PPB	269.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-004BH

0.5- 2.5 10G



## ANALYTIC #16 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8 12 16 20  
(x 1000 UV)

TIME PRINTED: MAY 16, 95 12:00

SAMPLE TIME: MAY 16, 95 11:53

## METHOD

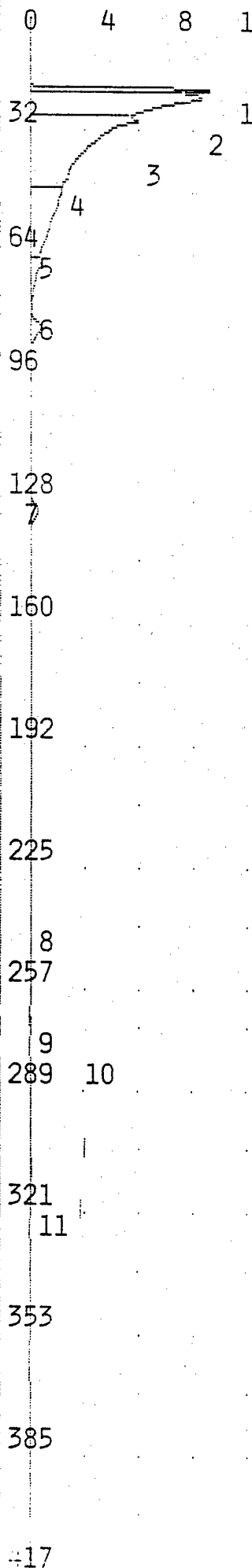
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 11 ML/MIN  
B/F FLOW 11 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 450.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	15.08 MVS	19.4
2	UNKNOWN	46.38 MVS	21.5
3	UNKNOWN	61.38 MVS	27.6
4	UNKNOWN	21.83 MVS	46.4
5	BENZENE	2.193 PPB	64.1
6	UNKNOWN	4.145 MVS	80.9
7	TOLUENE	3.670 PPB	128.2
8	UNKNOWN	11.97 MVS	237.2
9	ETHYLBENZENE	9.949 PPB	268.5
10	M,P-XYLENE	177.7 PPB	283.4
11	O-XYLENE	156.5 PPB	319.7

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-004BH  
5.0- 7.0 10G



0 2 4 6 8 10  
(x 10 MV)

TIME PRINTED: MAY 16,95 15:38

SAMPLE TIME: MAY 16,95 15:30

## METHOD

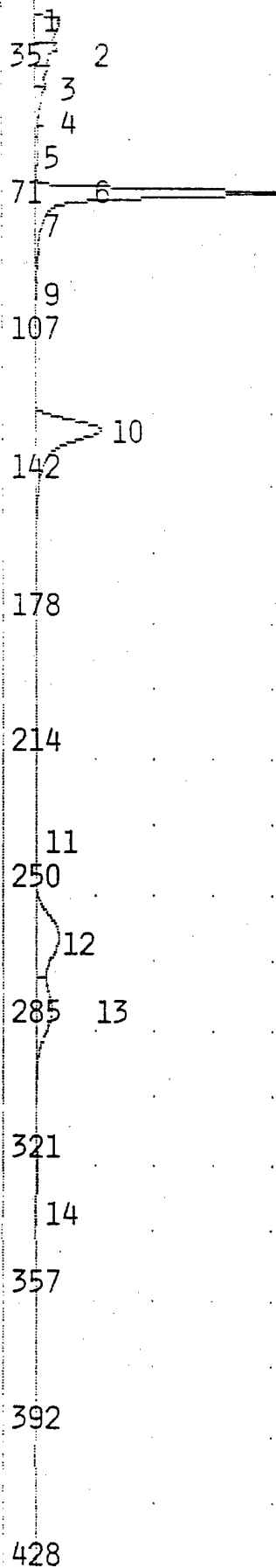
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.050 MVS	16.6
2	UNKNOWN	8.773 MVS	18.7
3	UNKNOWN	32.01 MVS	20.3
4	UNKNOWN	22.56 MVS	26.8
5	UNKNOWN	12.13 MVS	32.0
6	UNKNOWN	25.04 MVS	36.3
7	UNKNOWN	9.629 MVS	51.0
8	UNKNOWN	201.0 MVS	64.2
9	UNKNOWN	0.299 MVS	80.0
10	UNKNOWN	130.8 MVS	126.1
11	UNKNOWN	0.086 MVS	230.2
12	UNKNOWN	79.92 MVS	258.4
13	UNKNOWN	58.90 MVS	277.8
14	UNKNOWN	9.116 MVS	324.5

## NOTES

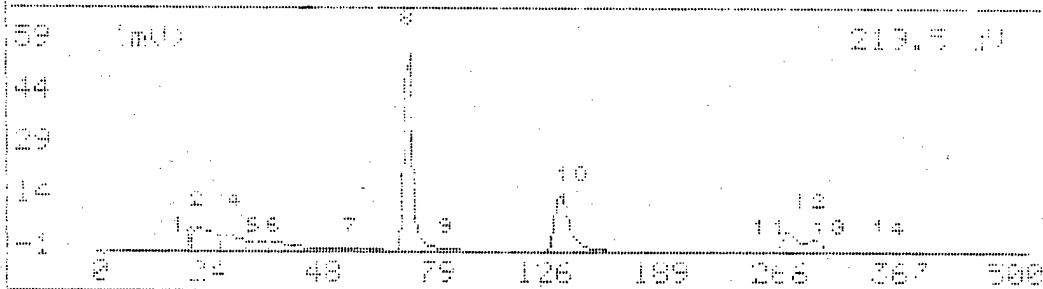
JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX



S.C. ready      Plot+BL Function      May 13, 95      13:46  
 -- Analysis No 18      -- Run at -- May 18, 95      15:20 --  
 PK No      Name      Conc/Area      Alarm      Ret. Time

6	Unknown	25.04 mV	-No-	20.0 sec
7	Unknown	5.529 mV	-No-	31.0 sec
8	benzene	100.0 ppb	-No-	34.2 sec
9	Unknown	0.299 mV	-No-	60.0 sec
10	toluene	100.0 ppb	-No-	61.1 sec
11	Unknown	0.386 mV	-No-	63.2 sec
12	ethyl benzene	100.0 ppb	-No-	68.1 sec
13	m-xylene	200.0 ppb	-No-	73.0 sec
14	o-xylene	100.0 ppb	-No-	74.0 sec

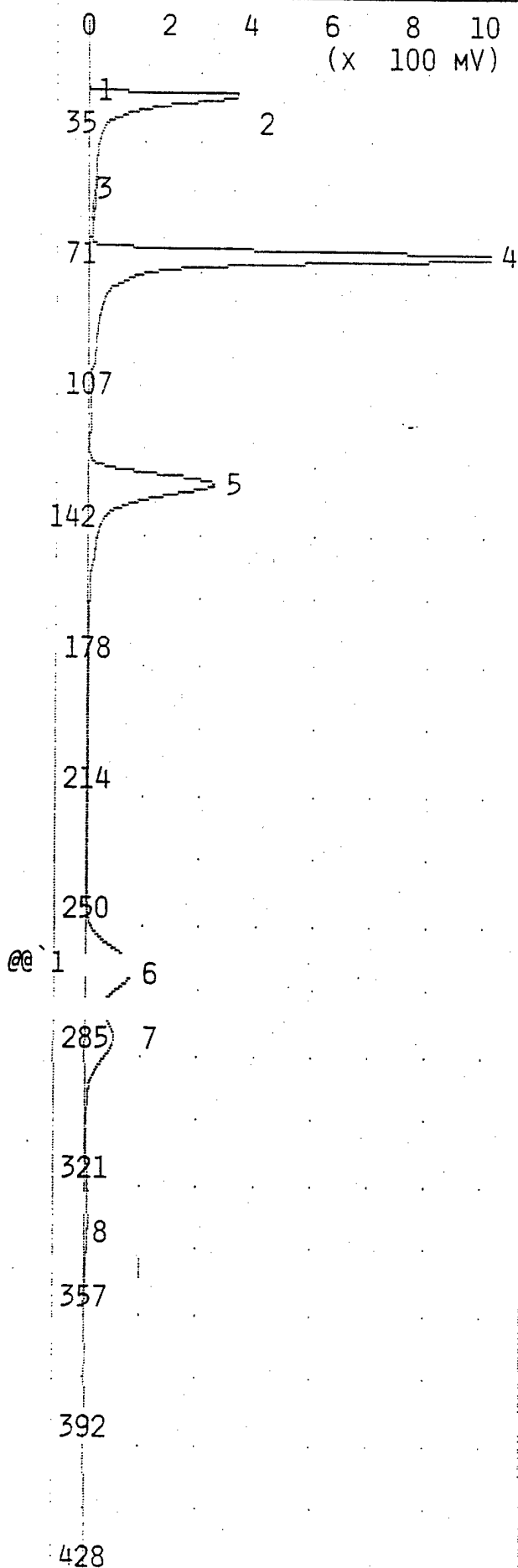
- Detected 14 peaks. Use + - to scroll -      265 sec





## ANALYSIS #21

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 16,95 15:56

SAMPLE TIME: MAY 16,95 15:48

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 12 ML/MIN

B/F FLOW 12 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 32 C

MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

## PEAK REPORT

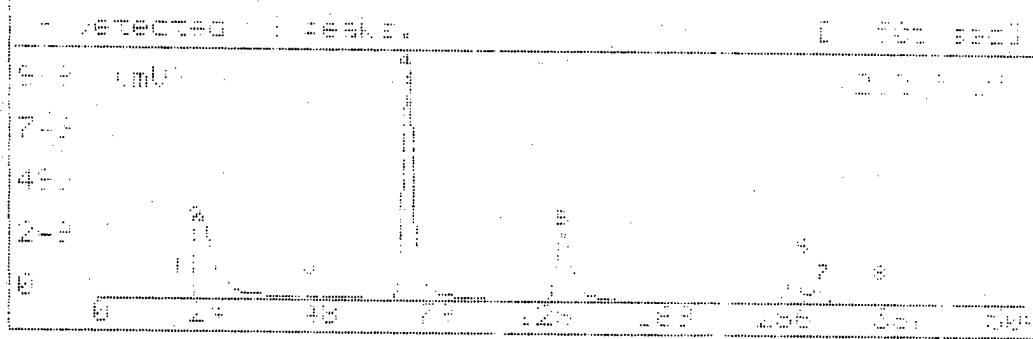
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.060 MVS	16.6
2	UNKNOWN	2.379 VSEC	20.4
3	UNKNOWN	30.14 MVS	43.2
4	BENZENE	2.803 PPM	64.6
5	TOLUENE	2.327 PPM	126.5
6	ETHYLBENZENE	2.108 PPM	259.4
7	M,P-XYLENE	3.727 PPM	278.4
8	O-XYLENE	3.723 PPM	325.8

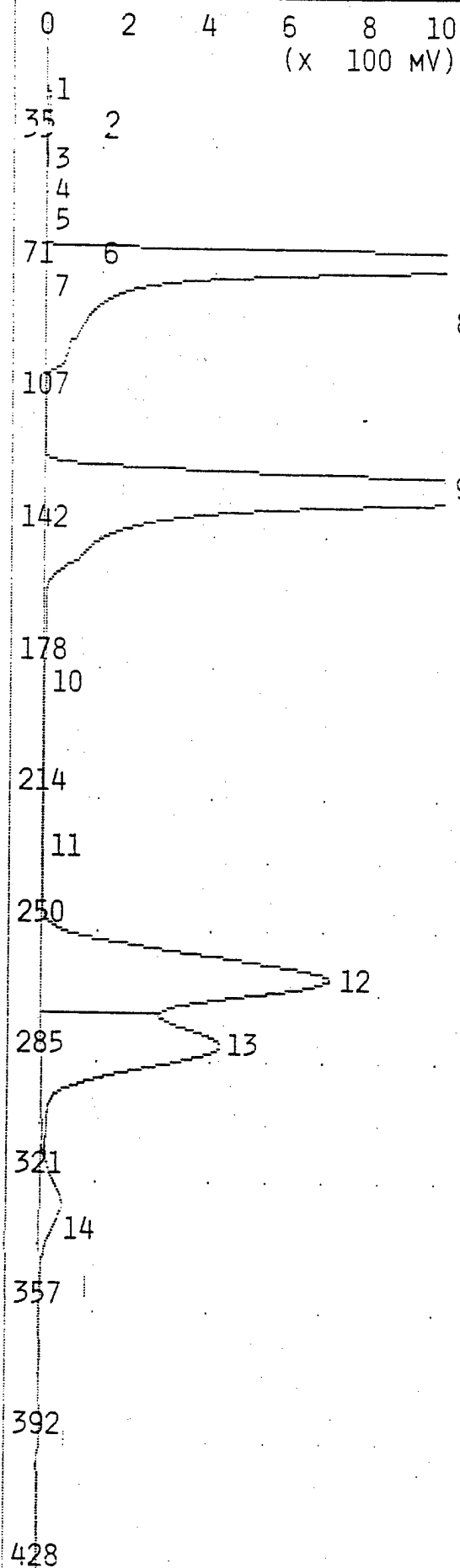
## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
1 PPM BTEX

S.L. Peak: 100% 100% 100%  
 Analysis: 21 100% 100% 100%  
 100% 100% 100% 100% 100% 100%

Unknown	0.000	100%	100%	100%	100%
Unknown	0.000	100%	100%	100%	100%
Unknown	0.000	100%	100%	100%	100%
benzene	0.000	100%	100%	100%	100%
toluene	0.000	100%	100%	100%	100%
ethyl acetate	0.000	100%	100%	100%	100%
M. Ethyl acetate	0.000	100%	100%	100%	100%
Ortolene	0.000	100%	100%	100%	100%





TIME PRINTED: MAY 16,95 16:11

SAMPLE TIME: MAY 16,95 16:02

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 32 C  
 MAX GAIN 1000  
 ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.060 MVS	16.7
2	UNKNOWN	7.290 MVS	18.9
3	UNKNOWN	53.09 MVS	20.6
4	UNKNOWN	36.55 MVS	27.0
5	UNKNOWN	20.70 MVS	31.9
6	UNKNOWN	38.02 MVS	36.4
7	UNKNOWN	11.98 MVS	50.9
8	BENZENE	3.009 PPM	65.2
9	TOLUENE	6.233 PPM	127.7
10	UNKNOWN	18.33 MVS	179.2
11	UNKNOWN	2.078 MVS	223.2
12	ETHYLBENZENE	5.917 PPM	260.2
13	M,P-XYLENE	11.75 PPM	278.4
14	O-XYLENE	3.681 PPM	325.3

## NOTES

JOE BYRD, JR.  
 DULUTH ANG3  
 10 PPM BTEX

0 1 2 3 4 5  
(x 1000 UV)

TIME PRINTED: MAY 16, 95 16:26

SAMPLE TIME: MAY 16, 95 16:17

## METHOD

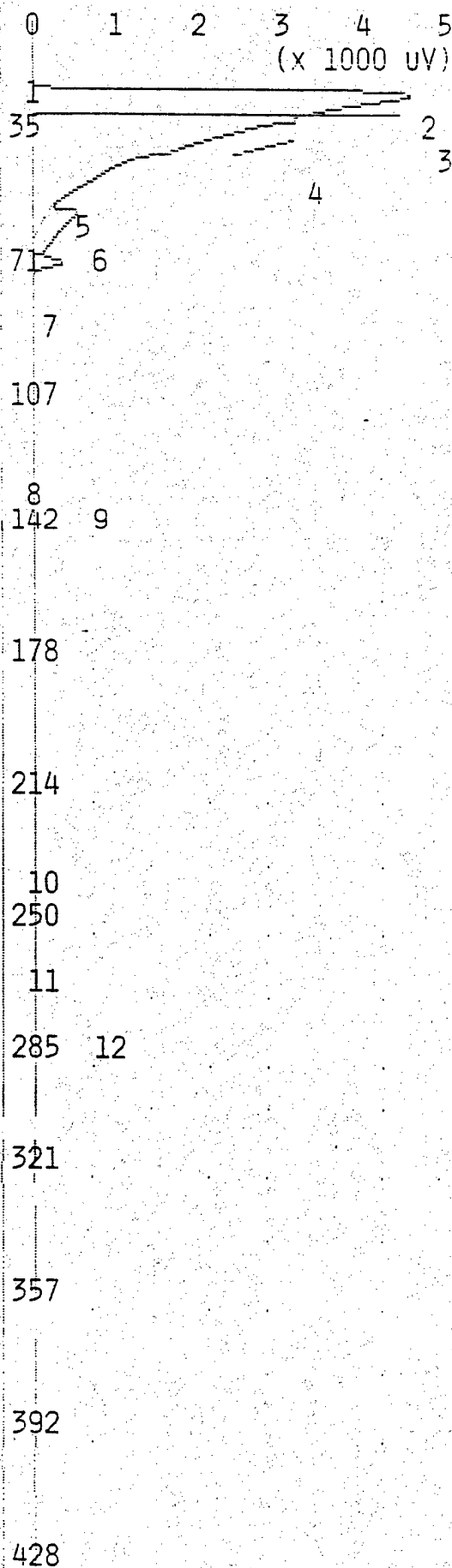
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 32 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

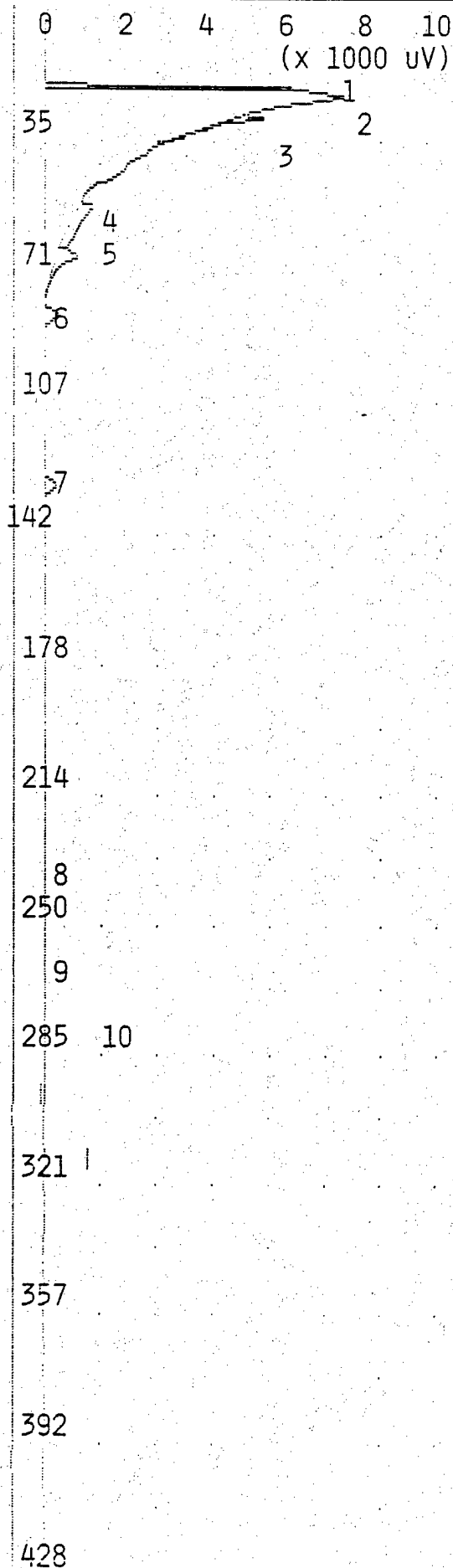
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.040 MVS	16.5
2	UNKNOWN	6.238 MVS	19.1
3	UNKNOWN	85.06 MVS	20.5
4	UNKNOWN	0.599 MVS	26.9
5	UNKNOWN	3.556 MVS	51.5
6	BENZENE	1.098 PPB	64.5
7	UNKNOWN	1.293 MVS	80.6
8	TOLUENE	0.887 PPB	126.9
9	UNKNOWN	0.162 MVS	129.3
10	UNKNOWN	0.658 MVS	229.8
11	ETHYLBENZENE	6.002 PPB	261.0
12	M,P-XYLENE	8.717 PPB	278.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK



ANALYSIS #24 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 16,95 16:38  
SAMPLE TIME: MAY 16,95 16:30

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

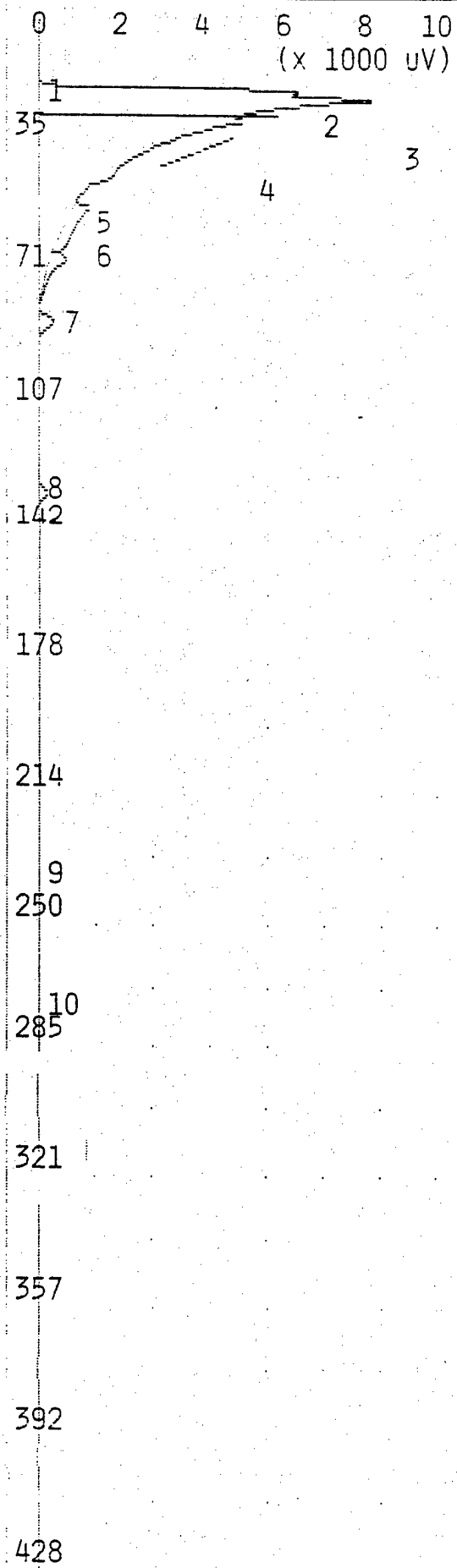
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	9.815 MVS	19.1
2	UNKNOWN	129.2 MVS	20.9
3	UNKNOWN	1.162 MVS	27.1
4	UNKNOWN	3.264 MVS	51.0
5	BENZENE	1.026 PPB	64.6
6	UNKNOWN	1.713 MVS	81.0
7	TOLUENE	4.015 PPB	127.0
8	UNKNOWN	9.807 MVS	231.2
9	ETHYLBENZENE	4.295 PPB	260.5
10	M,P-XYLENE	8.423 PPB	278.4

NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-004BH  
10.0-12.0 10G

## ANALYSIS #25 10S+ GC FUNCTION ANALYSIS REPORT

TIME PRINTED: MAY 16,95 16:51  
SAMPLE TIME: MAY 16,95 16:43

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

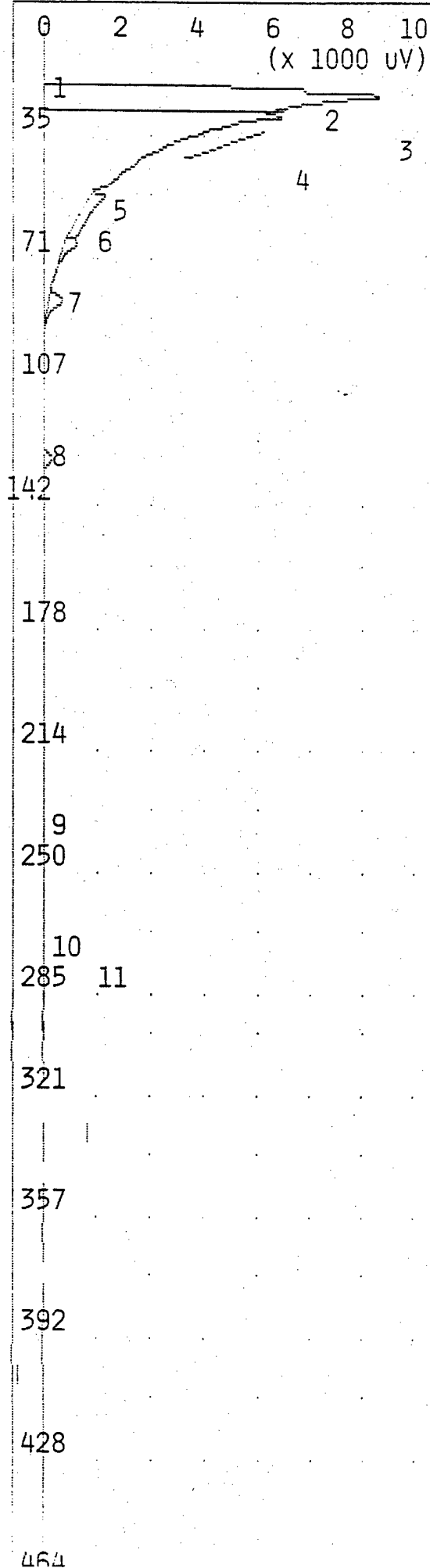
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.354 MVS	17.6
2	UNKNOWN	10.22 MVS	19.3
3	UNKNOWN	127.6 MVS	21.6
4	UNKNOWN	1.419 MVS	27.4
5	UNKNOWN	3.965 MVS	51.0
6	BENZENE	0.823 PPB	65.0
7	UNKNOWN	1.873 MVS	81.4
8	TOLUENE	3.459 PPB	127.7
9	UNKNOWN	1.753 MVS	232.8
10	ETHYLBENZENE	0.258 PPB	264.0

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-0043H

18.0-20.0 10G



TIME PRINTED: MAY 16, 95 17:27

SAMPLE TIME: MAY 16, 95 17:19

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 12 ML/MIN

B/F FLOW 12 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 31 C

MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.095 MVS	17.4
2	UNKNOWN	10.08 MVS	19.3
3	UNKNOWN	153.9 MVS	21.4
4	UNKNOWN	1.521 MVS	27.6
5	UNKNOWN	3.825 MVS	51.0
6	BENZENE	0.627 PPB	65.0
7	UNKNOWN	1.483 MVS	81.0
8	TOLUENE	2.780 PPB	127.3
9	UNKNOWN	2.663 MVS	231.4
10	ETHYLBENZENE	1.715 PPB	264.0
11	M,P-XYLENE	5.519 PPB	278.9

## NOTES

JOE BYRD, JR.

DULUTH ANGB

025-004BH RESHOT

5.0- 7.0 10G

0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 16,95 17:39

SAMPLE TIME: MAY 16,95 17:31

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

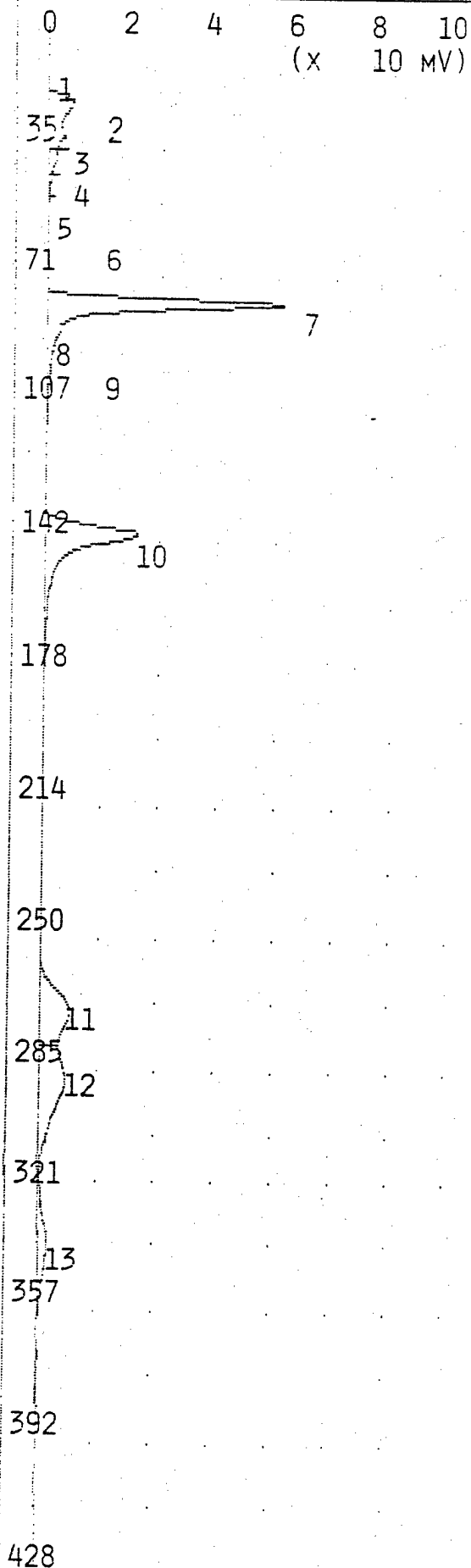
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.059 MVS	16.9
2	UNKNOWN	10.52 MVS	19.2
3	UNKNOWN	52.81 MVS	21.0
4	UNKNOWN	37.52 MVS	27.6
5	UNKNOWN	57.25 MVS	32.6
6	UNKNOWN	19.65 MVS	51.1
7	BENZENE	106.2 PPB	65.2
8	UNKNOWN	0.651 MVS	80.6
9	TOLUENE	103.2 PPB	127.0
10	UNKNOWN	1.272 MVS	231.2
11	ETHYLBENZENE	98.22 PPB	259.2
12	M,P-XYLENE	188.0 PPB	278.1
13	O-XYLENE	68.30 PPB	324.2

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX





TIME PRINTED: MAY 17, 95 08:06

SAMPLE TIME: MAY 17, 95 07:57

## METHOD

SLOPE UP 0.500 MV/SEC  
 SLOPE DOWN 1.500 MV/SEC  
 MIN AREA 0.000 MVSEC  
 MIN HEIGHT 0.000 MV  
 ANALYSIS DELAY 0.0 SEC  
 WINDOW PERCENT 10.0 %  
 DET FLOW 12 ML/MIN  
 B/F FLOW 12 ML/MIN  
 AUX FLOW 0 ML/MIN  
 OVEN TEMP 40 C  
 AMB TEMP 29 C  
 MAX GAIN 1000  
 ANALYSIS TIME 500.0 SEC

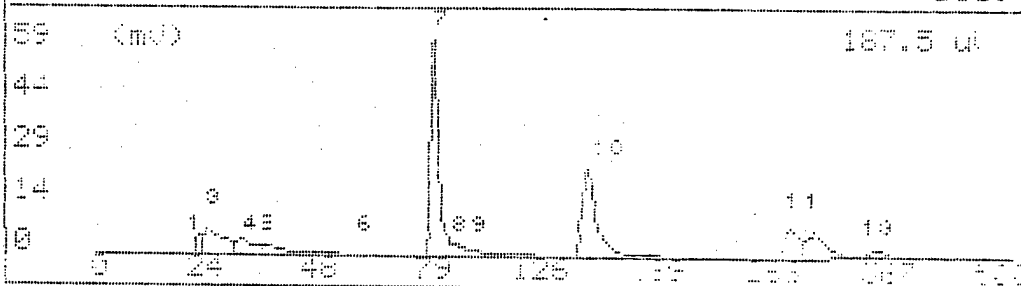
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.097 MVS	18.6
2	UNKNOWN	8.173 MVS	20.9
3	UNKNOWN	35.18 MVS	22.6
4	UNKNOWN	19.48 MVS	29.8
5	UNKNOWN	18.64 MVS	35.6
6	UNKNOWN	0.398 MVS	54.6
7	UNKNOWN	277.1 MVS	76.5
8	UNKNOWN	2.155 MVS	84.0
9	UNKNOWN	0.483 MVS	93.4
10	UNKNOWN	182.4 MVS	138.5
11	UNKNOWN	107.3 MVS	267.2
12	UNKNOWN	130.4 MVS	285.6
13	UNKNOWN	48.03 MVS	337.3

## NOTES

JOE BYRD, JR.  
 DULUTH ANGB  
 100 PPB BTEX

E.L. Ready		100+ GC Function		100+ GC	
Analysis no 3		Run at 100.00		100.00	
Pl No	Name	Conc/Area	Unit	Ref. Time	
3	Unknown	18.64	mUS	100.00	100.00
6	Unknown	0.398	mUS	100.00	100.00
8	benzene	100.0	PpC	100.00	100.00
9	Unknown	2.155	mUS	100.00	100.00
9	Unknown	0.403	mUS	100.00	100.00
10	toluene	100.0	PpC	100.00	100.00
11	ethylbenzene	100.0	PpC	100.00	100.00
12	m,p-xylene	200.0	PpC	100.00	100.00
13	o-xylene	100.0	PpC	100.00	100.00
- Detected 13 peaks. Use + + to scroll					



0 2 4 6 8 10  
(x 100 MV)

TIME PRINTED: MAY 17,95 08:23

SAMPLE TIME: MAY 17,95 08:15

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

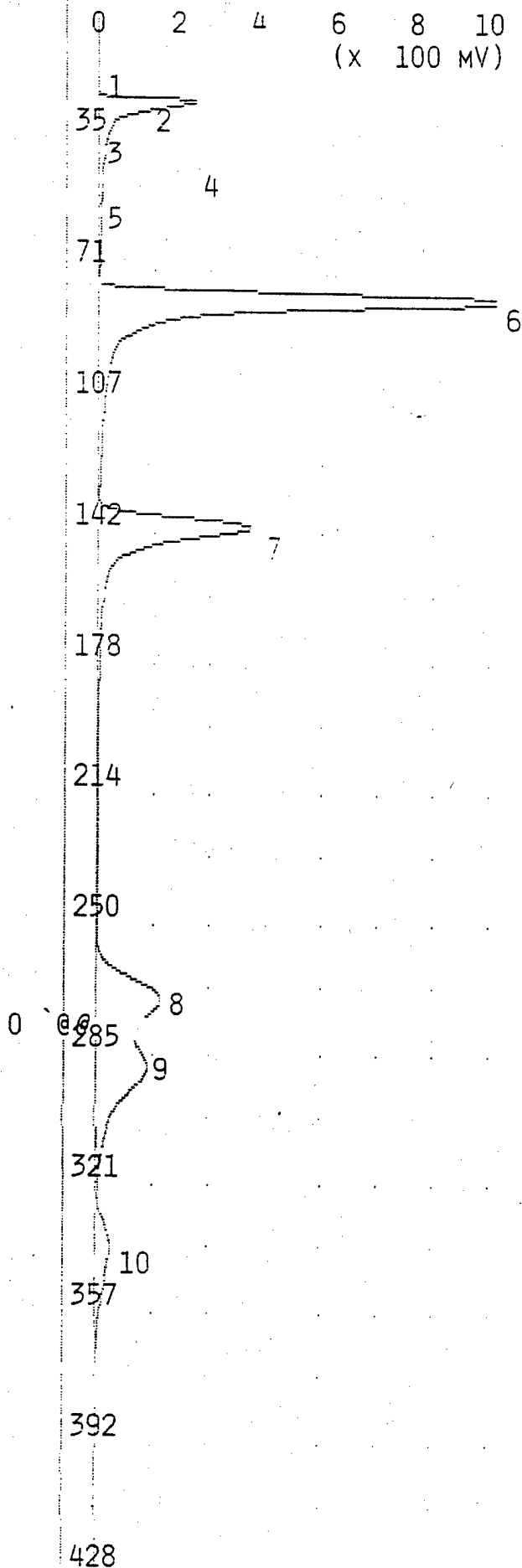
## PEAK REPORT

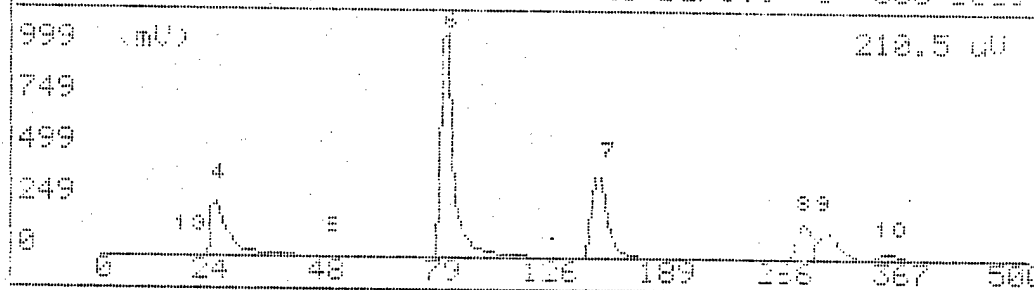
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.056 MVS	16.0
2	UNKNOWN	0.084 MVS	17.8
3	UNKNOWN	0.135 MVS	18.8
4	UNKNOWN	1.488 VSEC	23.0
5	UNKNOWN	0.596 MVS	47.8
6	BENZENE	2.734 PPM	77.2
7	TOLUENE	1.938 PPM	138.9
8	ETHYLBENZENE	2.221 PPM	268.2
9	M,P-XYLENE	3.749 PPM	286.6
10	O-XYLENE	2.084 PPM	337.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB

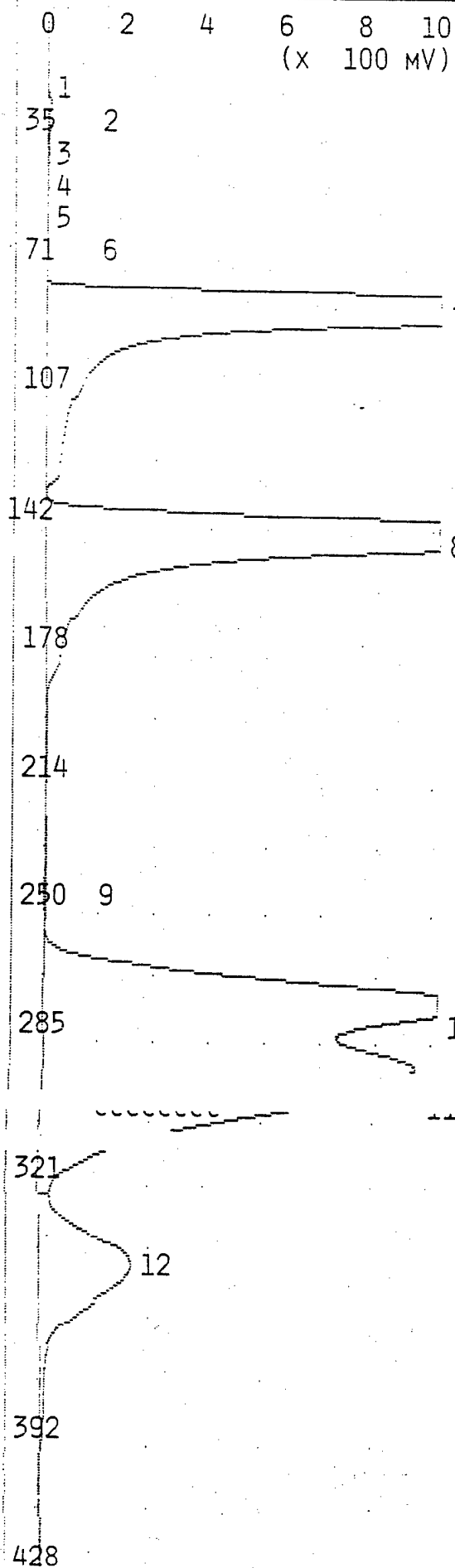
1 PPM BTEX



[illegible]

ANALYSIS #5

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 17, 95 08:38

SAMPLE TIME: MAY 17, 95 08:30

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

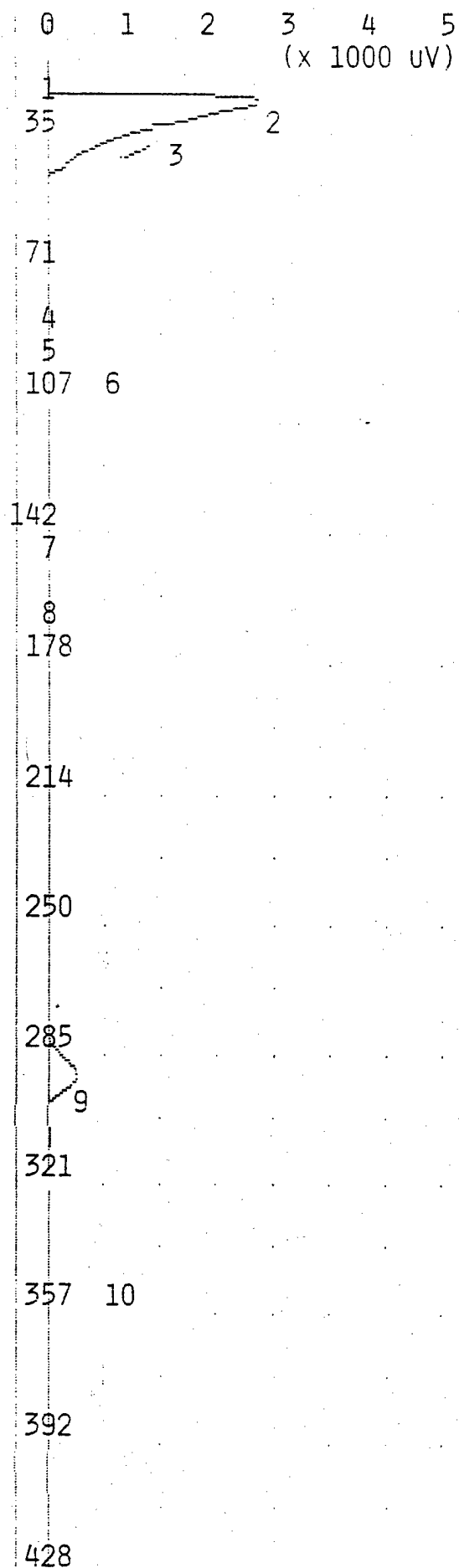
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.052 MVS	18.8
2	UNKNOWN	5.132 MVS	21.4
3	UNKNOWN	54.13 MVS	23.1
4	UNKNOWN	34.81 MVS	30.4
5	UNKNOWN	34.36 MVS	36.0
6	UNKNOWN	0.103 MVS	55.3
7	BENZENE	3.956 PPM	79.8
8	TOLUENE	7.032 PPM	141.3
9	UNKNOWN	4.330 MVS	236.6
10	ETHYLBENZENE	7.386 PPM	272.2
11	M,P-XYLENE	14.38 PPM	289.8
12	O-XYLENE	5.601 PPM	341.0

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
10 PPM BTEX





TIME PRINTED: MAY 17,95 08:54

SAMPLE TIME: MAY 17,95 08:45

## METHOD

SLOPE UP 0.500 MV/SEC

SLOPE DOWN 1.500 MV/SEC

MIN AREA 0.000 MVSEC

MIN HEIGHT 0.000 MV

ANALYSIS DELAY 0.0 SEC

WINDOW PERCENT 10.0 %

DET FLOW 12 ML/MIN

B/F FLOW 12 ML/MIN

AUX FLOW 0 ML/MIN

OVEN TEMP 40 C

AMB TEMP 30 C

MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.067 MVS	18.5
2	UNKNOWN	52.43 MVS	22.8
3	UNKNOWN	0.196 MVS	29.5
4	BENZENE	0.795 PPB	76.9
5	UNKNOWN	5.512 MVS	84.9
6	UNKNOWN	27.63 MVS	94.4
7	TOLUENE	11.98 PPB	140.6
8	UNKNOWN	5.801 MVS	161.0
9	M,P-XYLENE	83.47 PPB	289.8
10	O-XYLENE	19.58 PPB	347.0

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 17, 95 10:06

SAMPLE TIME: MAY 17, 95 09:58

## METHOD

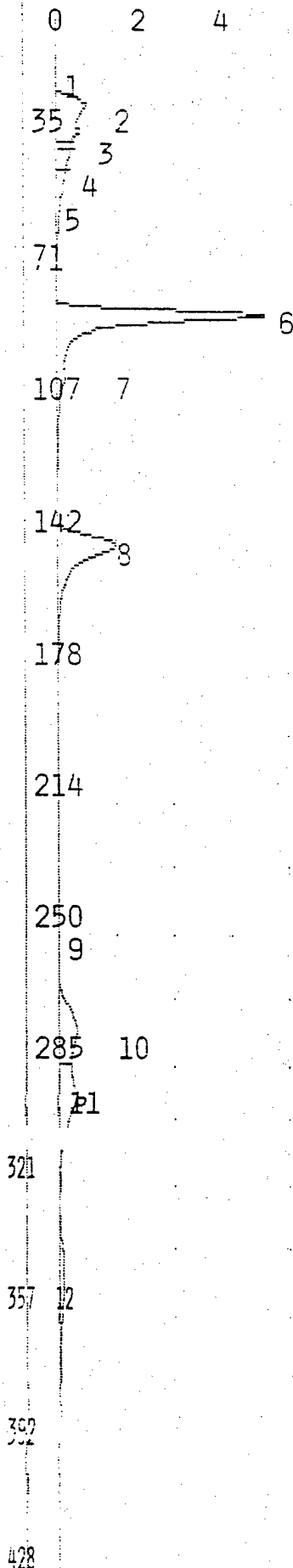
SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.046 MVS	19.4
2	UNKNOWN	7.622 MVS	22.1
3	UNKNOWN	46.85 MVS	24.2
4	UNKNOWN	31.99 MVS	31.2
5	UNKNOWN	56.32 MVS	36.9
6	BENZENE	96.58 PPB	79.8
7	UNKNOWN	2.715 MVS	96.5
8	TOLUENE	70.20 PPB	141.7
9	UNKNOWN	1.079 MVS	246.1
10	ETHYLBENZENE	61.78 PPB	273.0
11	M,P-XYLENE	118.6 PPB	290.9
12	O-XYLENE	51.25 PPB	344.3

NOTES

JOE BIRD, JR.  
DULUTH, ARIZ  
100 PPM STEV







## ANALYSIS #13

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 1000 UV)

TIME PRINTED: MAY 17,95 10:21

SAMPLE TIME: MAY 17,95 10:13

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.077 MVS	19.7
2	UNKNOWN	119.7 MVS	24.4
3	UNKNOWN	0.911 MVS	31.4
4	UNKNOWN	1.426 MVS	42.8
5	BENZENE	2.879 PPB	85.3
6	UNKNOWN	13.61 MVS	97.3
7	ETHYLBENZENE	0.985 PPB	255.2

## NOTES

JOE BYRD, JR.  
DULUTH ANG  
AIR BLANK

## ANALYSIS #14

## 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(X 10 MV)

TIME PRINTED: MAY 17,95 10:42

SAMPLE TIME: MAY 17,95 10:34

## METHOD

SLOPE UP 0.500 M./SEC  
SLOPE DOWN 1.500 M./SEC  
MIN AREA 0.000 M.SEC  
MIN HEIGHT 0.000 M.  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 M./MIN  
B/F FLOW 12 M./MIN  
AUX FLOW 0 M./MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

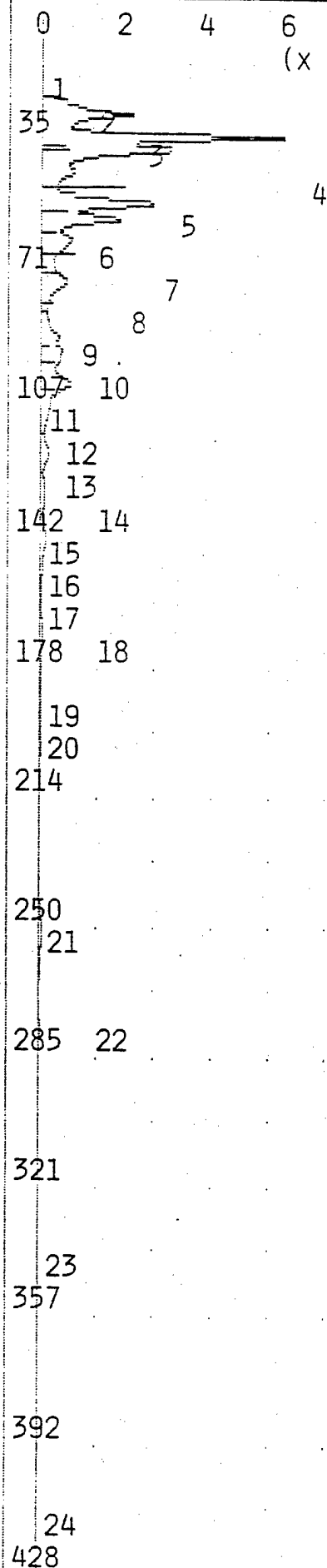
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.876 MVS	20.3
2	UNKNOWN	10.80 MVS	22.4
3	UNKNOWN	90.23 MVS	26.1
4	UNKNOWN	138.2 MVS	32.2
5	UNKNOWN	113.7 MVS	35.6
6	UNKNOWN	37.41 MVS	41.4
7	UNKNOWN	92.95 MVS	49.0
8	UNKNOWN	67.48 MVS	53.4
9	UNKNOWN	50.40 MVS	59.1
10	UNKNOWN	58.45 MVS	70.6
11	BENZENE	3.206 PPB	82.2
12	UNKNOWN	18.85 MVS	86.0
13	UNKNOWN	35.74 MVS	89.8
14	UNKNOWN	65.71 MVS	98.6
15	UNKNOWN	19.15 MVS	117.3
16	UNKNOWN	13.99 MVS	126.6
17	TOLUENE	20.95 PPB	141.3
18	UNKNOWN	17.51 MVS	165.8
19	UNKNOWN	10.29 MVS	186.4
20	UNKNOWN	9.078 MVS	195.6
21	UNKNOWN	21.56 MVS	248.8
22	ETHYLBENZENE	17.04 PPB	274.1
23	O-XYLENE	38.68 PPE	340.0
24	UNKNOWN	2.272 MVS	413.0

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-012BH

0.5- 2.5 10G



ANALYSIS #15 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8 12 16 20  
(x 10 MV)

TIME PRINTED: MAY 17,95 10:56  
SAMPLE TIME: MAY 17,95 10:48

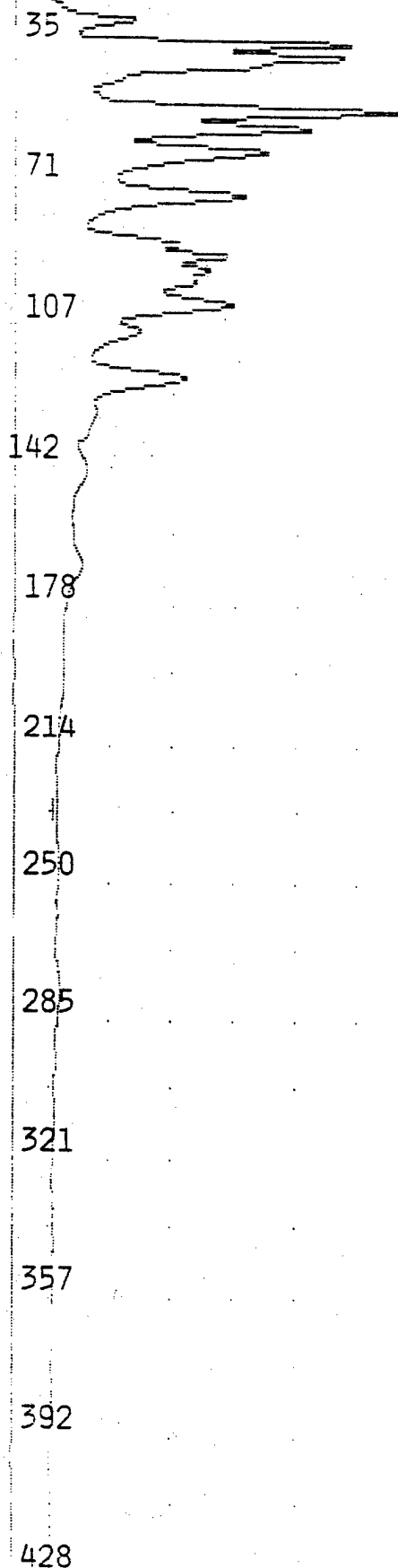
METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

PEAK REPORT

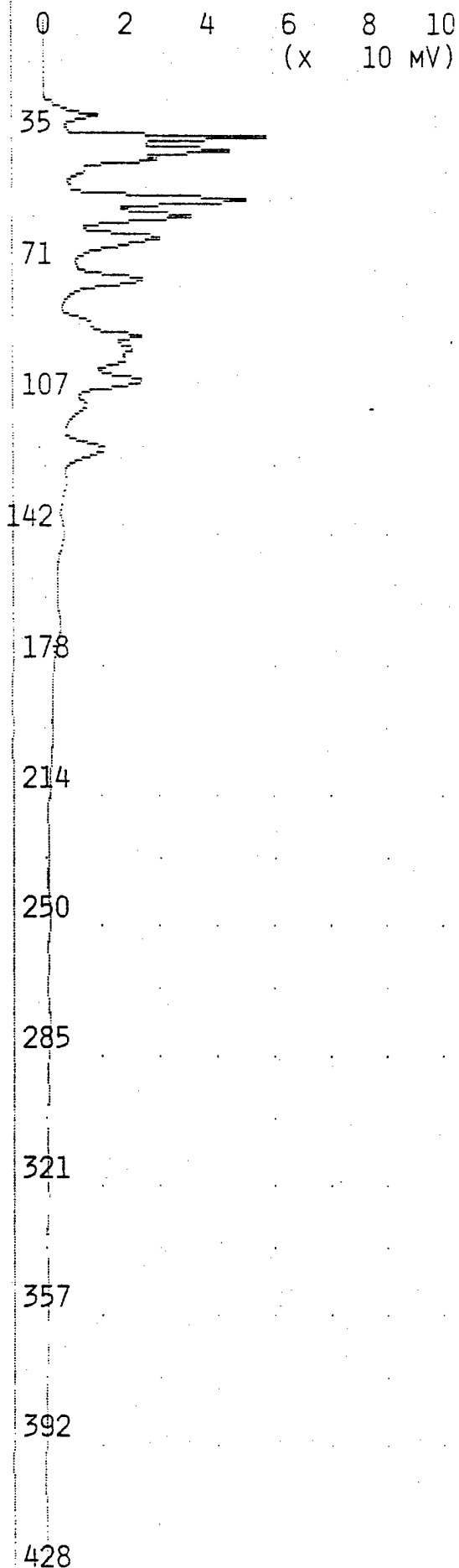
PK COMPOUND NAME AREA/CONC R.T.



NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-012BH  
5.0- 7.0 10G

ANALYSIS #16 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 17,95 11:09  
SAMPLE TIME: MAY 17,95 11:01

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

PEAK REPORT

PK COMPOUND NAME AREA/CONC R.T.

NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-012BH RESHOT  
5.0- 7.0 10G  
20 MICROLITER INJECTION

## ANALYSIS #17 10S+ GC FUNCTION ANALYSIS REPORT

0 4 8 12 16 20  
(X 10 MV)

TIME PRINTED: MAY 17,95 11:20

SAMPLE TIME: MAY 17,95 11:12

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MV/SEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	1.160 MVS	20.6
2	UNKNOWN	17.70 MVS	22.6
3	UNKNOWN	421.9 MVS	26.6
4	UNKNOWN	347.6 MVS	32.7
5	UNKNOWN	360.0 MVS	36.4
6	UNKNOWN	341.5 MVS	38.6
7	UNKNOWN	60.44 MVS	45.9
8	UNKNOWN	170.8 MVS	49.6
9	UNKNOWN	108.6 MVS	54.2
10	UNKNOWN	136.4 MVS	60.8
11	UNKNOWN	158.6 MVS	71.3
12	BENZENE	48.28 PPB	83.8
13	UNKNOWN	167.5 MVS	86.6
14	UNKNOWN	71.74 MVS	98.4
15	UNKNOWN	57.25 MVS	117.4
16	TOLUENE	31.41 PPB	143.6
17	UNKNOWN	5.800 MVS	244.2
18	ETHYLBENZENE	4.454 PPB	272.2
19	O-XYLENE	13.64 PPB	341.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-012BH  
10.0-12.0 106

0 1 2 3 4 5  
(x 100 MV)

TIME PRINTED: MAY 17,95 11:32

SAMPLE TIME: MAY 17,95 11:24

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

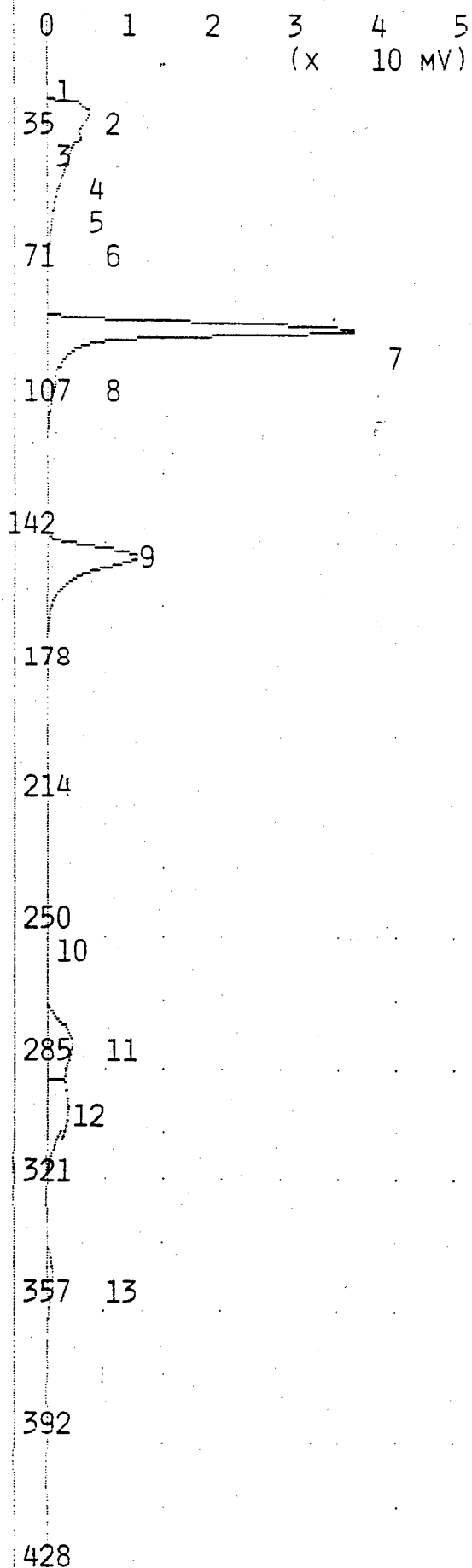
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	5.800 MVS	20.8
2	UNKNOWN	19.48 MVS	22.5
3	UNKNOWN	405.5 MVS	26.8
4	UNKNOWN	684.6 MVS	32.9
5	UNKNOWN	754.6 MVS	36.4
6	UNKNOWN	15.49 MVS	38.8
7	UNKNOWN	263.0 MVS	50.1
8	UNKNOWN	175.4 MVS	54.8
9	UNKNOWN	109.4 MVS	60.5
10	UNKNOWN	141.9 MVS	72.0
11	BENZENE	40.98 PPB	87.3
12	UNKNOWN	77.65 MVS	99.2
13	UNKNOWN	63.48 MVS	118.2
14	TOLUENE	45.51 PPB	145.0
15	UNKNOWN	3.486 MVS	195.4

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-012BH  
18.0-20.0 10G

428

## ANALYSIS #19 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 17,95 13:29

SAMPLE TIME: MAY 17,95 13:21

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

## PEAK REPORT

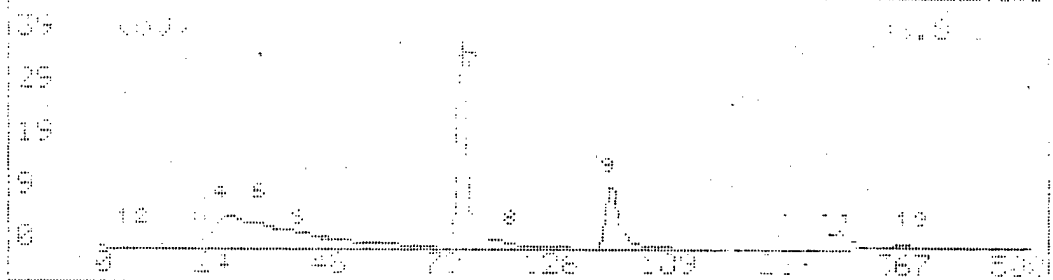
PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.889 MVS	5.2
2	UNKNOWN	2.797 MVS	9.2
3	UNKNOWN	0.411 MVS	20.2
4	UNKNOWN	126.7 MVS	25.2
5	UNKNOWN	1.455 MVS	32.2
6	UNKNOWN	0.765 MVS	38.3
7	BENZENE	76.67 PPB	83.8
8	UNKNOWN	0.453 MVS	98.4
9	TOLUENE	83.95 PPB	144.4
10	UNKNOWN	0.186 MVS	246.1
11	ETHYLBENZENE	79.82 PPB	276.2
12	M,P-XYLENE	151.3 PPB	293.8
13	O-XYLENE	78.02 PPB	347.0

## NOTES

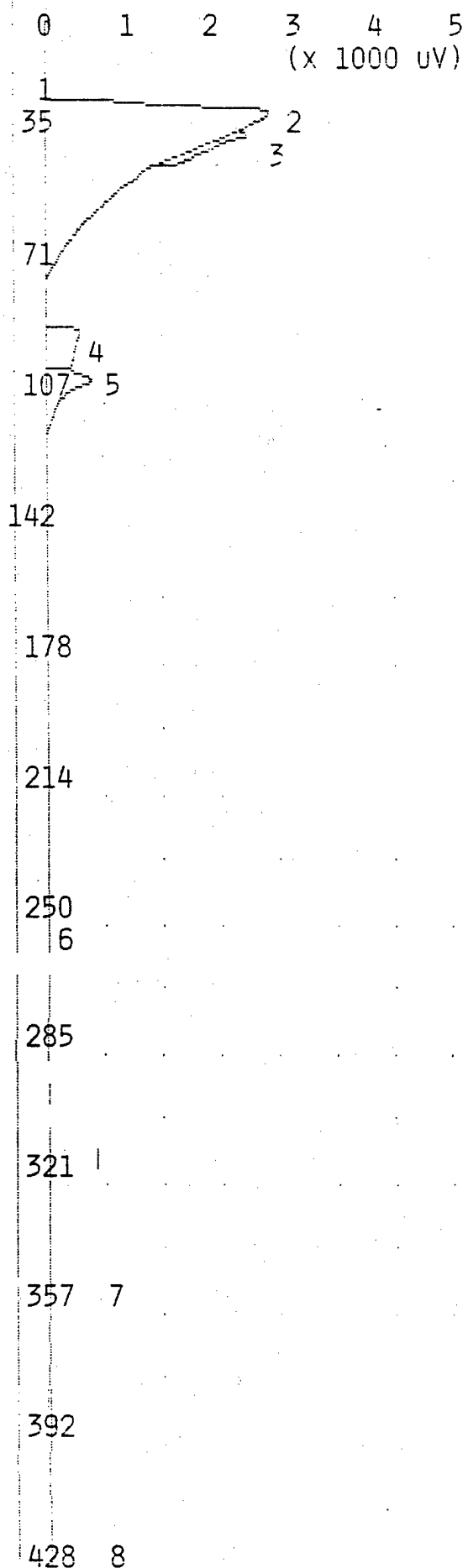
JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX



g.c. ready		100% ID function		3:23	
-- Analysis No 17		Run at - Ma		3:23	
Pk No	Name	Conc	Area	Time	Area
1	Unknown	1.455	MUS	10.0	10.0
2	Unknown	2.765	MUS	10.0	10.0
3	Benzene	100.0	POD	10.0	10.0
4	Unknown	1.455	MUS	10.0	10.0
5	Toluene	100.0	POD	10.0	10.0
6	Unknown	1.198	MUS	10.0	10.0
7	ethyl benzene	100.0	POD	10.0	10.0
8	Unknown	100.0	POD	10.0	10.0
9	Unknown	100.0	POD	10.0	10.0
10	Unknown	100.0	POD	10.0	10.0
Total 15 peaks, 100% area					



ANALYSIS #20 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 17,95 13:44  
SAMPLE TIME: MAY 17,95 13:36

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 29 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.033 MVS	20.0
2	UNKNOWN	74.26 MVS	25.4
3	UNKNOWN	1.632 MVS	32.0
4	BENZENE	2.989 PPB	86.5
5	UNKNOWN	4.932 MVS	98.1
6	ETHYLBENZENE	0.816 PPB	251.4
7	O-XYLENE	73.16 PPB	349.0
8	UNKNOWN	4.197 MVS	414.3

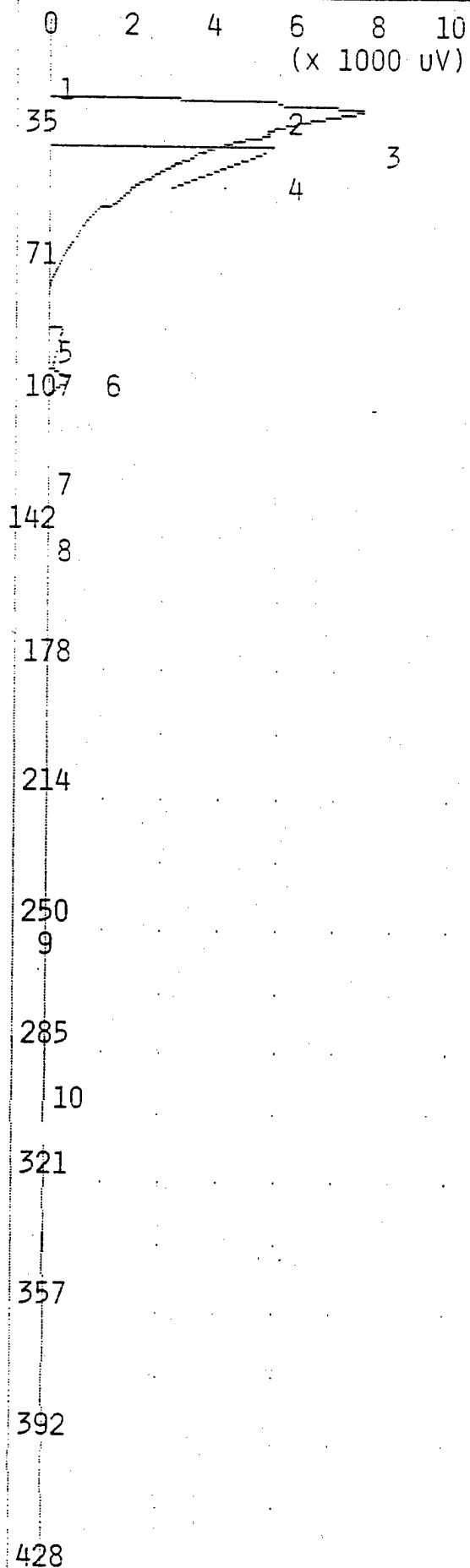
NOTES

JOE BYRD, JR.  
DULUTH ANGB

~~025-013BH~~ *J*

~~0.5 2.5 100~~  
AIR BLANK

ANALYSIS #21 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 17,95 13:56  
SAMPLE TIME: MAY 17,95 13:47

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

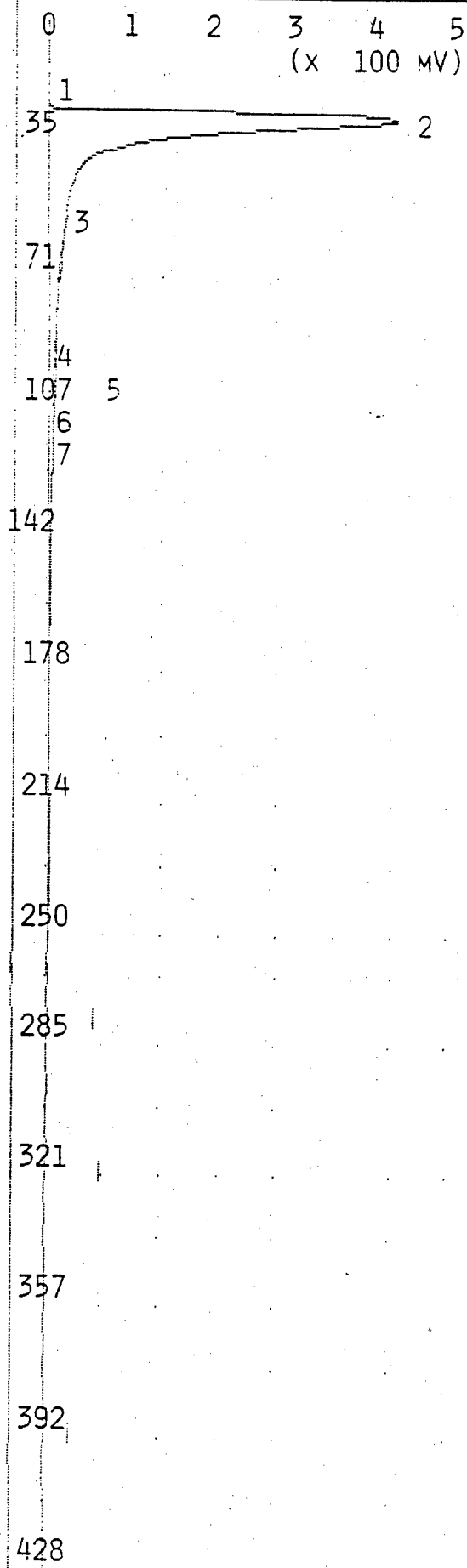
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.157 MVS	20.1
2	UNKNOWN	9.574 MVS	22.6
3	UNKNOWN	180.6 MVS	25.0
4	UNKNOWN	0.528 MVS	31.6
5	BENZENE	3.574 PPB	84.9
6	UNKNOWN	17.75 MVS	98.4
7	UNKNOWN	16.86 MVS	119.3
8	TOLUENE	2.556 PPB	142.9
9	ETHYLBENZENE	1.346 PPB	251.2
10	M,P-XYLENE	3.317 PPB	294.4

NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-013BH  
0.5- 2.5 10G

ANALYSIS #26 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 17,95 15:18  
SAMPLE TIME: MAY 17,95 15:09

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

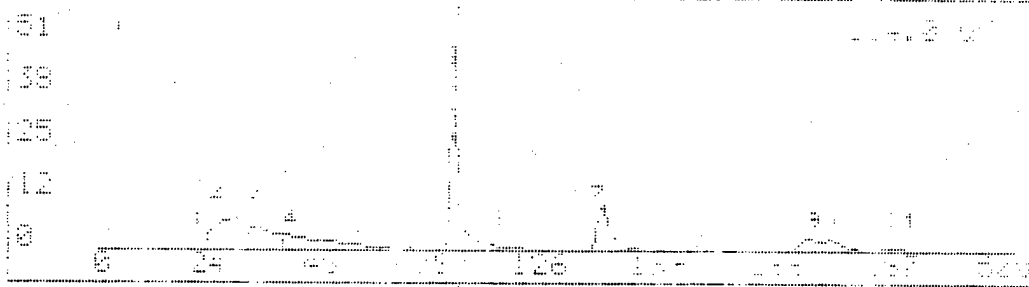
PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.025 MVS	20.5
2	UNKNOWN	4.491 VSEC	26.8
3	UNKNOWN	21.96 MVS	54.2
4	BENZENE	1.045 PPB	84.4
5	UNKNOWN	2.850 MVS	91.8
6	UNKNOWN	3.364 MVS	95.8
7	UNKNOWN	7.268 MVS	100.5

NOTES

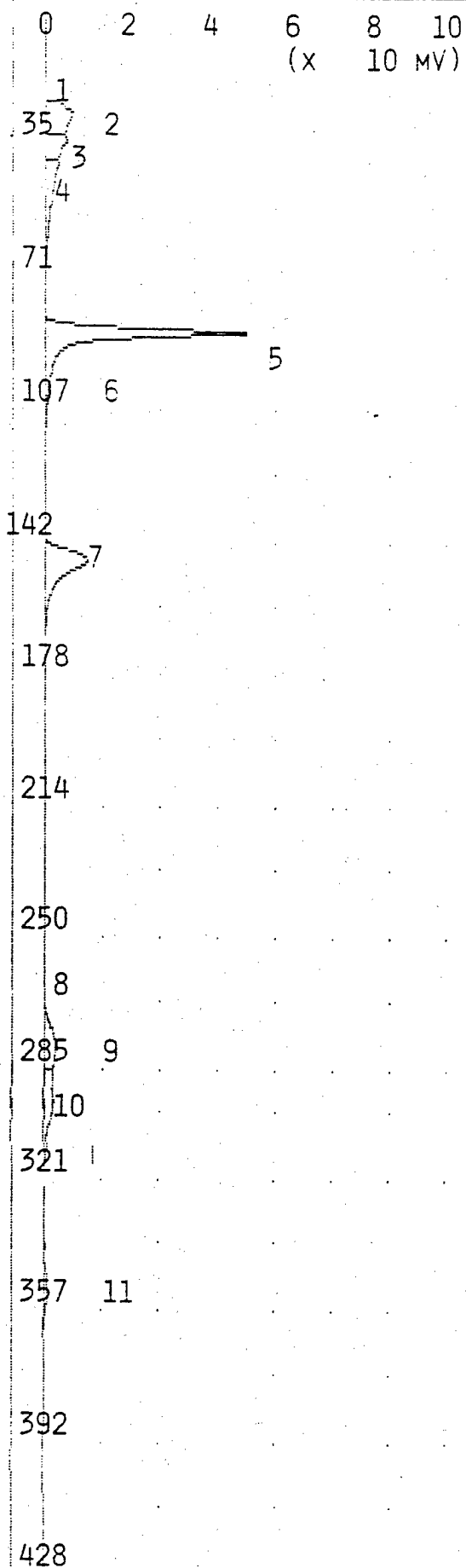
JOE BYRD, JR.  
DULUTH ANGB  
AIR BLANK

Address	Disassembly	Comment	Hex
00000000	CALL	CALL	00000000
00000001	CALL	CALL	00000001
00000002	CALL	CALL	00000002
00000003	CALL	CALL	00000003
00000004	CALL	CALL	00000004
00000005	CALL	CALL	00000005
00000006	CALL	CALL	00000006
00000007	CALL	CALL	00000007
00000008	CALL	CALL	00000008
00000009	CALL	CALL	00000009
0000000A	CALL	CALL	0000000A
0000000B	CALL	CALL	0000000B
0000000C	CALL	CALL	0000000C
0000000D	CALL	CALL	0000000D
0000000E	CALL	CALL	0000000E
0000000F	CALL	CALL	0000000F
00000010	CALL	CALL	00000010
00000011	CALL	CALL	00000011
00000012	CALL	CALL	00000012
00000013	CALL	CALL	00000013
00000014	CALL	CALL	00000014
00000015	CALL	CALL	00000015
00000016	CALL	CALL	00000016
00000017	CALL	CALL	00000017
00000018	CALL	CALL	00000018
00000019	CALL	CALL	00000019
0000001A	CALL	CALL	0000001A
0000001B	CALL	CALL	0000001B
0000001C	CALL	CALL	0000001C
0000001D	CALL	CALL	0000001D
0000001E	CALL	CALL	0000001E
0000001F	CALL	CALL	0000001F



## ANALYSIS #25

## 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 17,95 14:49

SAMPLE TIME: MAY 17,95 14:41

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 31 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.042 MVS	20.6
2	UNKNOWN	55.58 MVS	25.6
3	UNKNOWN	31.74 MVS	32.8
4	UNKNOWN	56.63 MVS	39.0
5	BENZENE	95.93 PPB	84.2
6	UNKNOWN	1.090 MVS	98.9
7	TOLUENE	91.85 PPB	145.2
8	UNKNOWN	0.577 MVS	253.0
9	ETHYLBENZENE	87.00 PPB	277.0
10	M,P-XYLENE	177.5 PPB	294.4
11	O-XYLENE	92.84 PPB	347.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
100 PPB BTEX

0 2 4 6 8 10  
(x 10 MV)

TIME PRINTED: MAY 17,95 14:37

SAMPLE TIME: MAY 17,95 14:29

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

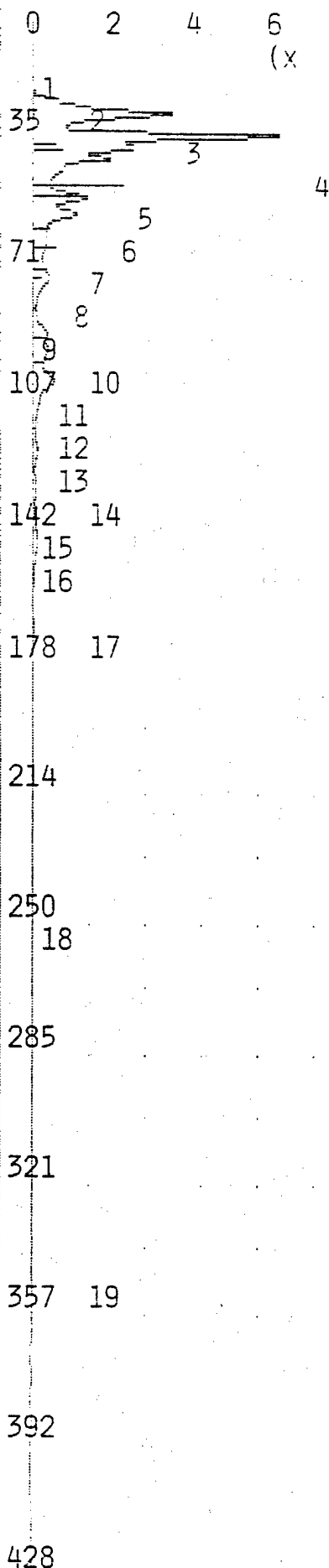
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	1.594 MVS	20.5
2	UNKNOWN	10.75 MVS	22.6
3	UNKNOWN	131.2 MVS	26.3
4	UNKNOWN	150.6 MVS	32.4
5	UNKNOWN	68.97 MVS	35.6
6	UNKNOWN	83.15 MVS	38.6
7	UNKNOWN	50.90 MVS	49.3
8	UNKNOWN	46.04 MVS	53.8
9	UNKNOWN	27.65 MVS	59.4
10	UNKNOWN	37.62 MVS	71.2
11	BENZENE	9.781 PPB	86.5
12	UNKNOWN	23.48 MVS	90.4
13	UNKNOWN	45.55 MVS	99.3
14	UNKNOWN	11.10 MVS	118.0
15	UNKNOWN	7.675 MVS	127.6
16	TOLUENE	16.38 PPB	143.0
17	UNKNOWN	3.007 MVS	166.4
18	ETHYLBENZENE	2.832 PPB	249.6
19	O-XYLENE	3.779 PPB	348.6

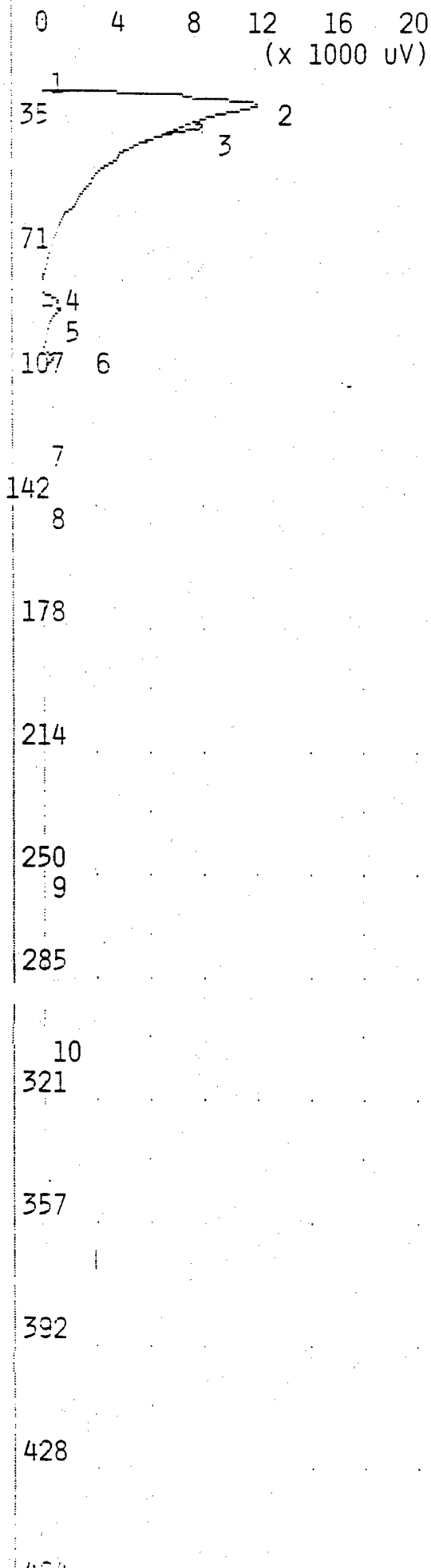
## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-013BH

18.0-20.0 10G



ANALYSIS #23 10S+ GC FUNCTION ANALYSIS REPORT



TIME PRINTED: MAY 17,95 14:19  
SAMPLE TIME: MAY 17,95 14:11

METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000  
ANALYSIS TIME 500.0 SEC

PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.243 MVS	20.6
2	UNKNOWN	242.3 MVS	25.2
3	UNKNOWN	2.060 MVS	31.8
4	UNKNOWN	2.665 MVS	82.1
5	BENZENE	3.515 PPB	84.1
6	UNKNOWN	4.841 MVS	98.2
7	UNKNOWN	0.440 MVS	120.5
8	TOLUENE	2.497 PPB	143.8
9	ETHYLBENZENE	3.962 PPB	251.2
10	M,P-XYLENE	2.483 PPB	299.2

NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-013BH  
10.0-12.0 10G



## ANALYSIS #22 10S+ GC FUNCTION ANALYSIS REPORT

0 2 4 6 8 10  
(x 1000 UV)

TIME PRINTED: MAY 17,95 14:07

SAMPLE TIME: MAY 17,95 13:59

## METHOD

SLOPE UP 0.500 MV/SEC  
SLOPE DOWN 1.500 MV/SEC  
MIN AREA 0.000 MVSEC  
MIN HEIGHT 0.000 MV  
ANALYSIS DELAY 0.0 SEC  
WINDOW PERCENT 10.0 %  
DET FLOW 12 ML/MIN  
B/F FLOW 12 ML/MIN  
AUX FLOW 0 ML/MIN  
OVEN TEMP 40 C  
AMB TEMP 30 C  
MAX GAIN 1000

ANALYSIS TIME 500.0 SEC

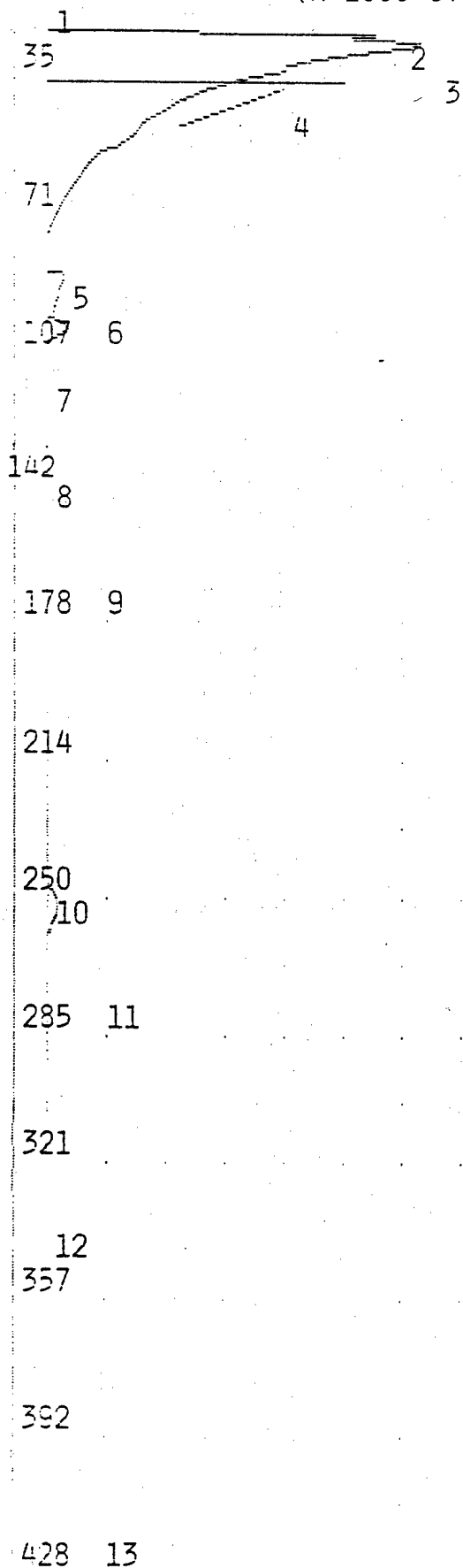
## PEAK REPORT

PK	COMPOUND NAME	AREA/CONC	R.T.
1	UNKNOWN	0.106 MVS	19.8
2	UNKNOWN	13.53 MVS	22.4
3	UNKNOWN	169.6 MVS	25.0
4	UNKNOWN	0.441 MVS	31.6
5	BENZENE	2.935 PPB	85.4
6	UNKNOWN	4.997 MVS	98.6
7	UNKNOWN	0.426 MVS	117.2
8	TOLUENE	2.283 PPB	143.7
9	UNKNOWN	0.406 MVS	165.6
10	UNKNOWN	15.39 MVS	249.6
11	ETHYLBENZENE	19.64 PPB	274.9
12	O-XYLENE	105.9 PPB	342.0
13	UNKNOWN	6.306 MVS	414.3

## NOTES

JOE BYRD, JR.  
DULUTH ANGB  
025-013BH

5.0- 7.0 10G



## **APPENDIX C**

### **MONITOR WELL CONSTRUCTION RECORDS**

## INTRODUCTION

The monitor wells for IRP Sites No. 25 and No. 26 were constructed as specified in the Site Investigation Work Plan. The monitor well construction diagram displays the water level data and well construction information for the well. Monitor well construction information includes an outline of the monitor well and contains the depth of the borehole, the screened interval, and the sand packed and bentonite interval.

Also included in this appendix are copies of the well record for the Minnesota Department of Health.

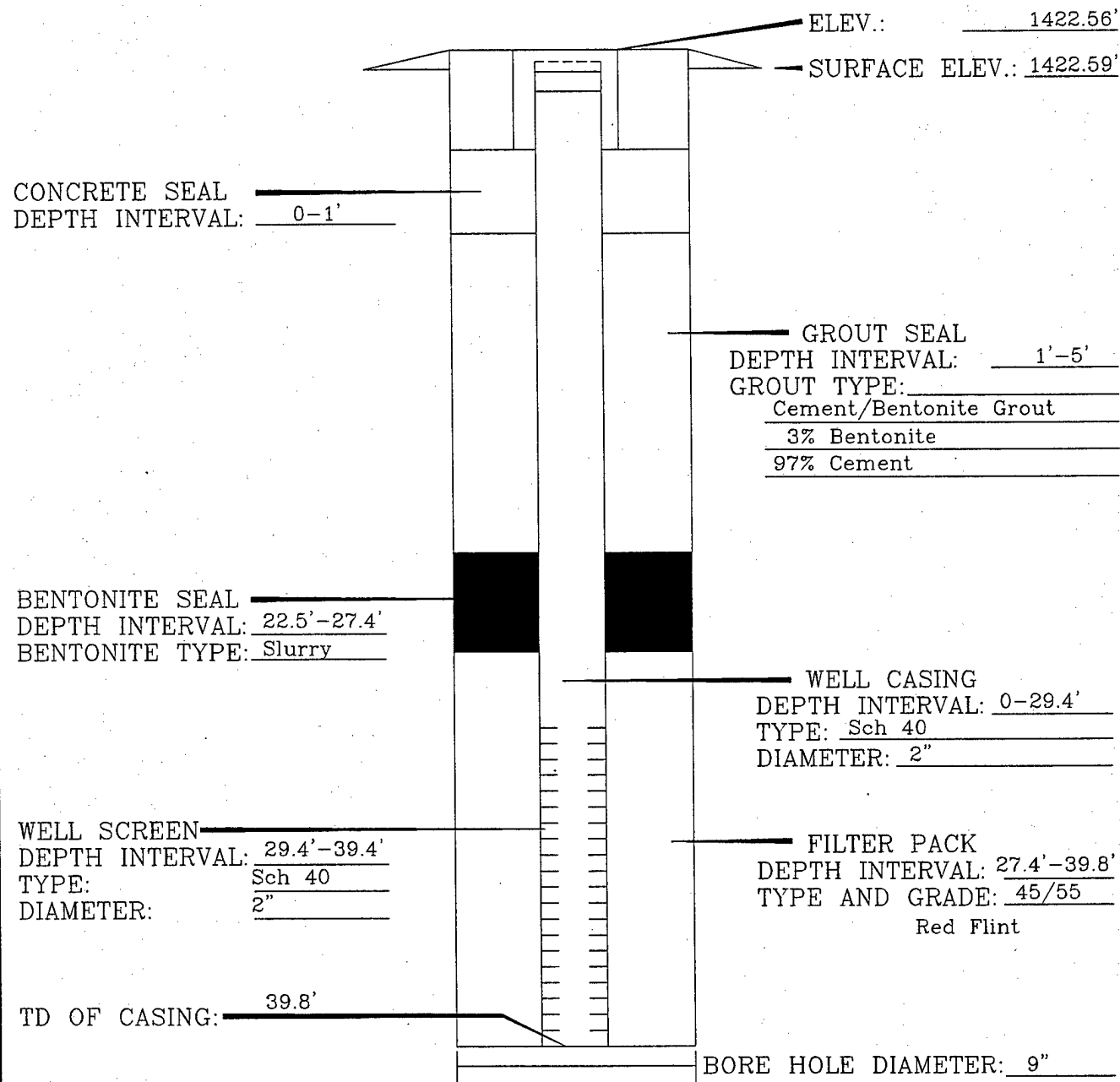
**THIS PAGE INTENTIONALLY LEFT BLANK**

TOP OF PROTECTIVE ENCASEMENT: \_\_\_\_\_

MANHOLE DIAMETER: \_\_\_\_\_

KEY NO.: \_\_\_\_\_

BOLT SIZE: \_\_\_\_\_



025-001MW  
MONITOR WELL CONSTRUCTION DIAGRAM  
Duluth Air National Guard  
Duluth, Minnesota

DULUTH\FISHWELL

OPTTECH  
OPERATIONAL TECHNOLOGIES  
CORPORATION

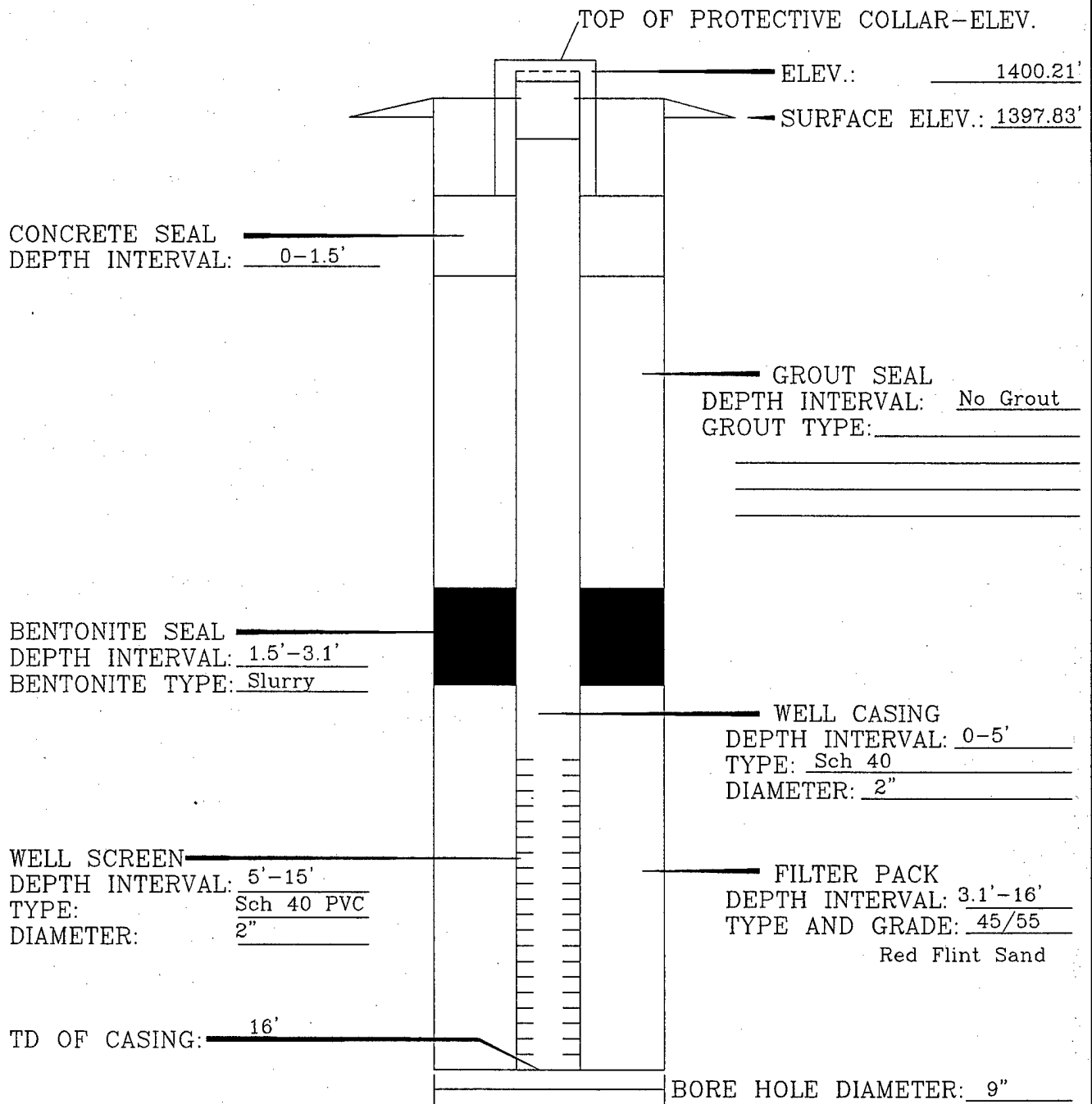
AUGUST 1995

TOP OF PROTECTIVE ENCASEMENT: \_\_\_\_\_

MANHOLE DIAMETER: \_\_\_\_\_

KEY NO.: \_\_\_\_\_

BOLT SIZE: \_\_\_\_\_



025-002MW  
MONITOR WELL CONSTRUCTION DIAGRAM  
Duluth Air National Guard  
Duluth, Minnesota

DULUTH\WELLDIAG

OPTECH  
OPERATIONAL TECHNOLOGIES  
CORPORATION

AUGUST 1995

TOP OF PROTECTIVE ENCASEMENT: \_\_\_\_\_

MANHOLE DIAMETER: \_\_\_\_\_

KEY NO.: \_\_\_\_\_

BOLT SIZE: \_\_\_\_\_

TOP OF PROTECTIVE COLLAR-ELEV. \_\_\_\_\_

ELEV.: 1405.32'

SURFACE ELEV.: 1402.71'

CONCRETE SEAL  
DEPTH INTERVAL: 0-4'

GROUT SEAL  
DEPTH INTERVAL: No Grout  
GROUT TYPE: \_\_\_\_\_

BENTONITE SEAL  
DEPTH INTERVAL: 4.0'-7.6'  
BENTONITE TYPE: Slurry

WELL CASING  
DEPTH INTERVAL: 0-19.7'  
TYPE: Sch 40  
DIAMETER: 2"

WELL SCREEN  
DEPTH INTERVAL: 9.7'-19.7'  
TYPE: Sch 40 PVC  
DIAMETER: 2"

FILTER PACK  
DEPTH INTERVAL: 7.6'-21'  
TYPE AND GRADE: 45/55  
Red Flint Sand

TD OF CASING: 21'

BORE HOLE DIAMETER: 9"

025-003MW

# MONITOR WELL CONSTRUCTION DIAGRAM

Duluth Air National Guard  
Duluth, Minnesota

DULUTH\WELLDIAG

OPTTECH  
OPERATIONAL TECHNOLOGIES  
CORPORATION

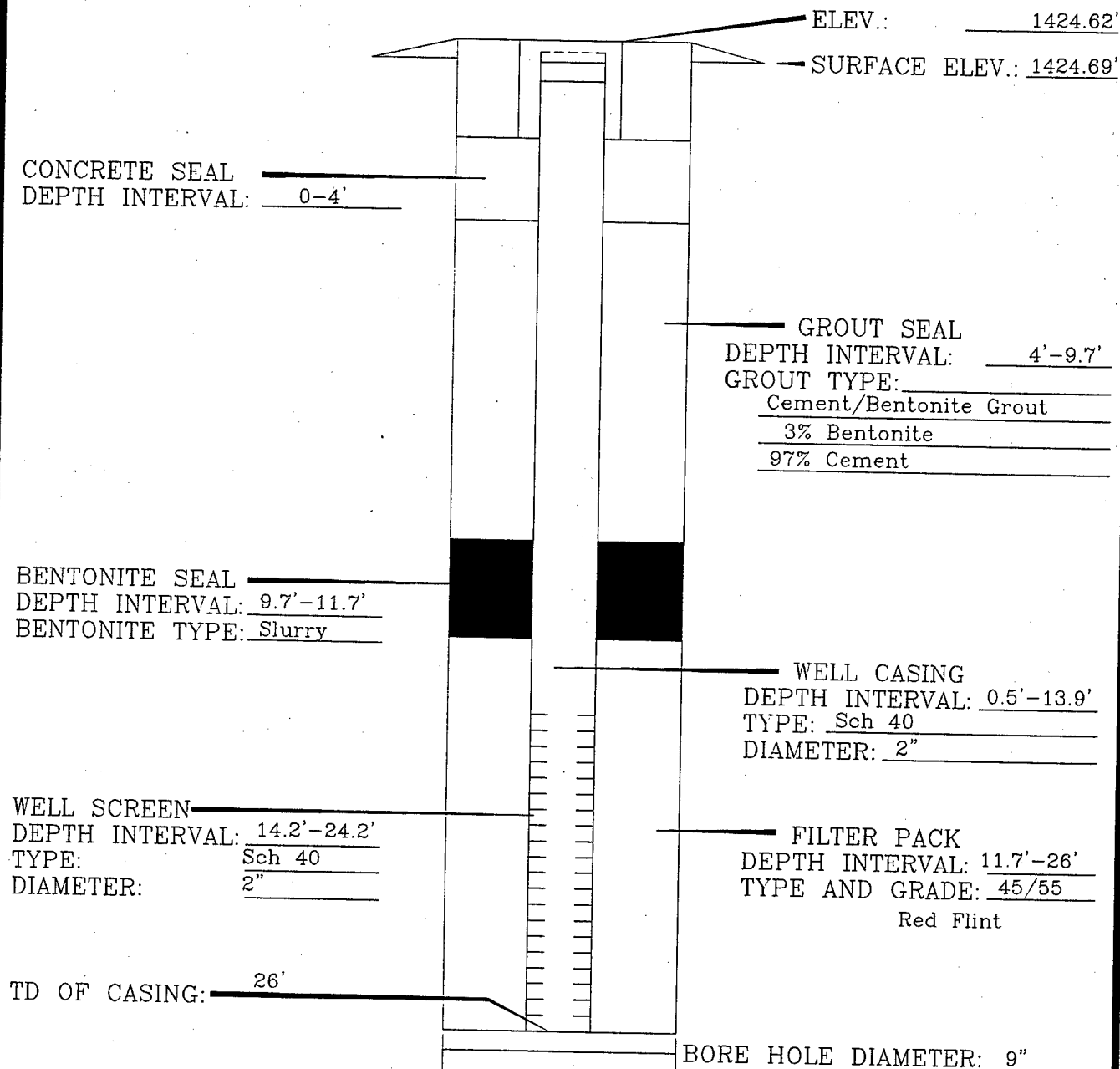
AUGUST 1995

TOP OF PROTECTIVE ENCASEMENT: \_\_\_\_\_

MANHOLE DIAMETER: \_\_\_\_\_

KEY NO.: \_\_\_\_\_

BOLT SIZE: \_\_\_\_\_



026-001MW  
MONITOR WELL CONSTRUCTION DIAGRAM

Duluth Air National Guard  
Duluth, Minnesota

DULUTH\FLSHWELL

OPTECH  
OPERATIONAL TECHNOLOGIES  
CORPORATION

AUGUST 1995

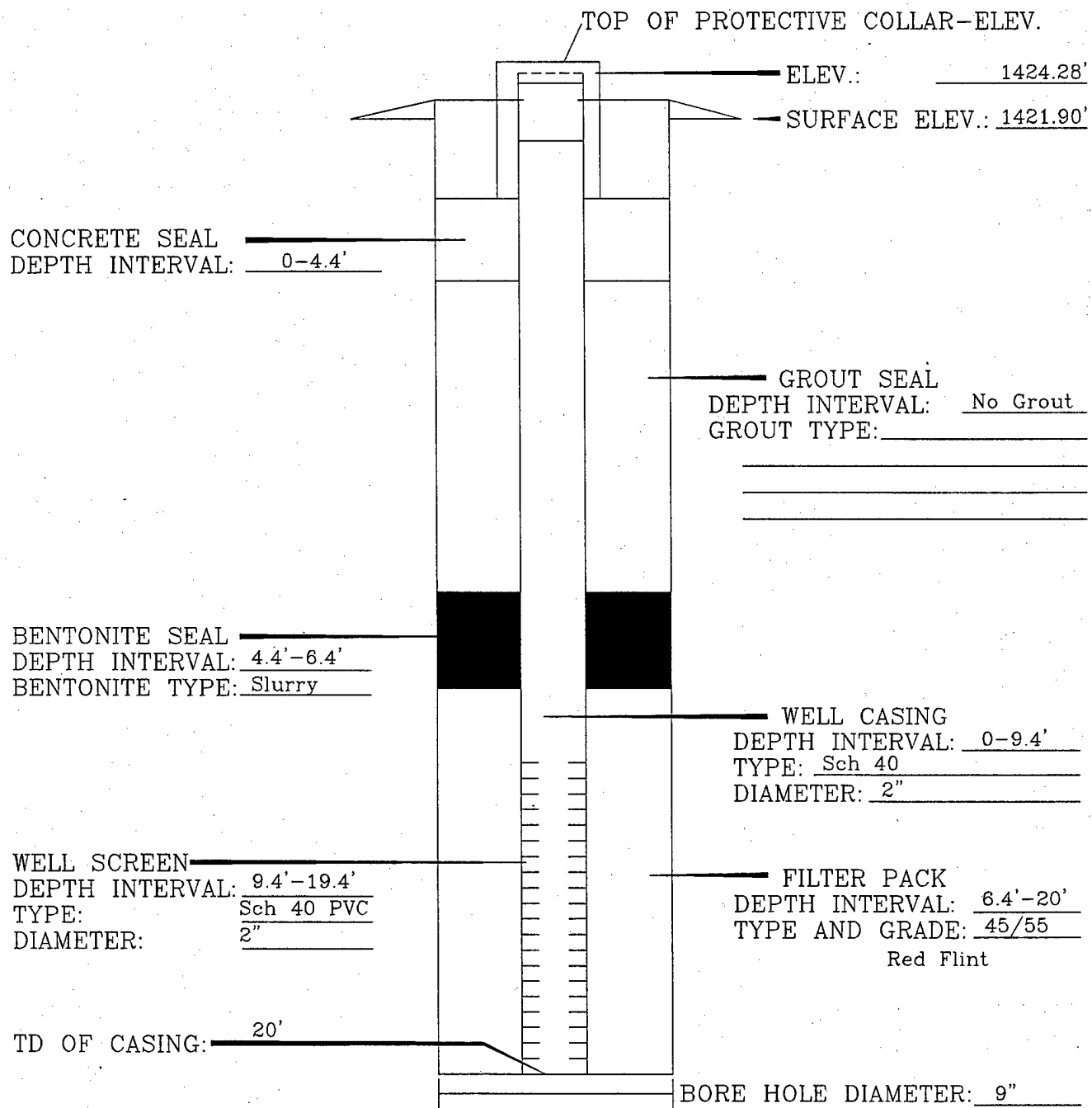


TOP OF PROTECTIVE ENCASEMENT: \_\_\_\_\_

MANHOLE DIAMETER: \_\_\_\_\_

KEY NO.: \_\_\_\_\_

BOLT SIZE: \_\_\_\_\_



026-002MW  
MONITOR WELL CONSTRUCTION DIAGRAM

Duluth Air National Guard  
Duluth, Minnesota

DULUTH\WELLDIAG

OPTTECH  
OPERATIONAL TECHNOLOGIES  
CORPORATION

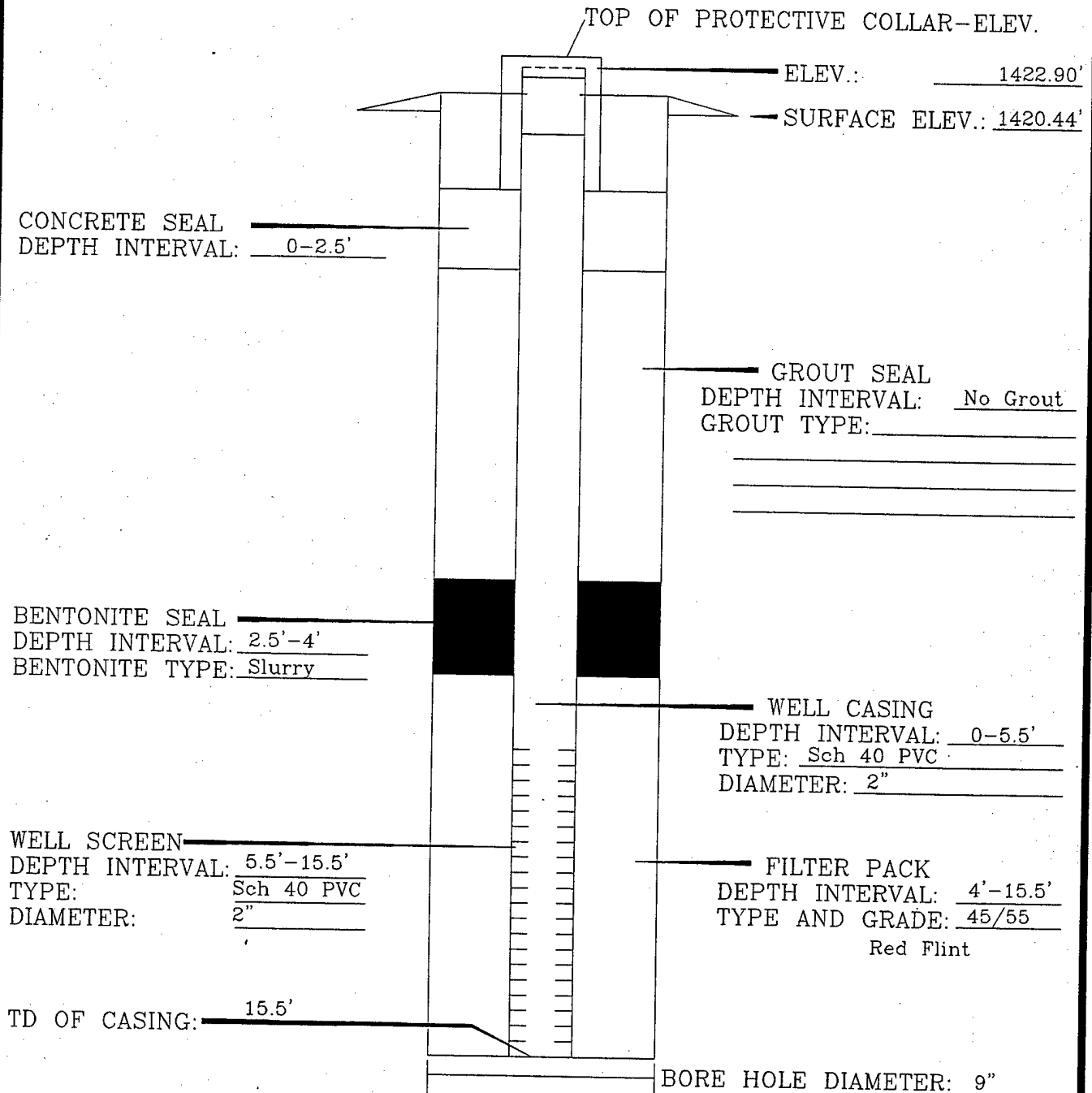
AUGUST 1995

TOP OF PROTECTIVE ENCASEMENT: \_\_\_\_\_

MANHOLE DIAMETER: \_\_\_\_\_

KEY NO.: \_\_\_\_\_

BOLT SIZE: \_\_\_\_\_



026-003MW  
MONITOR WELL CONSTRUCTION DIAGRAM

Duluth Air National Guard  
Duluth, Minnesota

DULUTH\WELLDIAG

OPTTECH  
OPERATIONAL TECHNOLOGIES  
CORPORATION

AUGUST 1995

## WELL LOCATION

County Name

ST. LOUIS

MINNESOTA DEPARTMENT OF HEALTH

## WELL RECORD

Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO.

564549

Township Name DULUTH Township No. 50N Range No. 14W Section No. 6 Fraction NW 1/4 SEC 14W

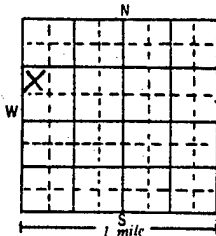
Numerical Street Address and City of Well Location

4680 Uper Street

or Fire Number

Show exact location of well in section grid with

Sketch map of well location. Showing property lines, roads and buildings.



PROPERTY OWNER'S NAME

M.N. A.R. NATIONAL GUARD.

Mailing address if different than property address indicated above.

4680 Uper Street  
Duluth MN. 55811

WELL DEPTH (completed)

39.4 ft.

Date Work Completed

5-10-95

DRILLING METHOD

☐ Cable Tool  
☒ Auger  
☐☐ Driven  
☐ Rotary☐ Dug  
☐ Jetted

DRILLING FLUID

None.

USE

☐ Domestic  
☐ Irrigation  
☐ Test Well☒ Monitoring  
☐ Public  
☐ Dewatering☐ Heating/Cooling  
☐ Industry/Commercial  
☐ Remedial

CASING

Drive Shoe? ☐ Yes ☒ No☐ Steel  
☒ Plastic☒ Threaded  
☐ Welded

HOLE DIAM.

CASING DIAMETER

2 in. to 29.4 ft.

WEIGHT

in. to ft.

in. to ft.

lbs./ft. 8.0

lbs./ft. 39.8

in. to ft.

in. to ft.

SCREEN

Make Johnson

Type sch. 40 PVC

Slot/Gauze 010

Set between 39.4 ft. and 29.4 ft.

OPEN HOLE

from ft. to ft.

Diam. 2"

Length 10'

STATIC WATER LEVEL

32.4 ft. ☒ below ☐ above land surface

Date measured 5-10-95

PUMPING LEVEL (below land surface)

ft. after

hrs. pumping g.p.m.

WELL HEAD COMPLETION

☐ Pitless adapter manufacturer

Model

☒ Casing Protection w/ 1/2" CONC. PAD. 12 in. above grade

GROUTING INFORMATION

Well grouted? ☒ Yes ☐ NoGrout Material Ne3 cement ☐ Bentonite

Bentonite from 27.0 to 22.0 ft.

Neat cement from 22.0 to 12 ft.

Bentonite from 12 to ft.

☐ yds. ☐ bags☐ yds. ☐ bags☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION

feet direction type

Well disinfected upon completion? ☐ Yes ☐ No

PUMP

☒ Not installed

Date installed

Manufacturer's name

Model number

HP

Volts

Length of drop pipe ft.

Capacity

g.p.m.

Pressure Tank Capacity

Type: ☐ Submersible☐ L.S. Turbine☐ Reciprocating☐ Jet☐

ABANDONED WELLS

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

American Engineering Testing Model 3  
Licensee Business Name Lic. or Reg. No.

Authorized Representative Signature Date 6-12-95

Name of Driller Jamie Toura Date 5-10-95

MINN. DEPT. OF HEALTH COPY

564549

HE-01205-04 (Rev. 5/92)

WELL LOCATION					MINNESOTA DEPARTMENT OF HEALTH <b>WELL RECORD</b> <i>Minnesota Statutes Chapter 103I</i>		MINNESOTA UNIQUE WELL NO. <div style="border: 1px solid black; padding: 5px; display: inline-block;">564550</div>	
County Name <u>ST. LOUIS.</u>								
Township Name <u>Duluth</u>	Township No. <u>50N</u>	Range No. <u>14W</u>	Section No. <u>6</u>	Fraction <u>NW 50/100 NW</u>	WELL DEPTH (completed) <u>15.0</u> ft.		Date Work Completed <u>5-11-95</u>	
Numerical Street Address and City of Well Location <u>4680 Uper Street</u>					or Fire Number		DRILLING METHOD <input type="checkbox"/> Cable Tool <input type="checkbox"/> Driven <input type="checkbox"/> Dug <input checked="" type="checkbox"/> Auger <input type="checkbox"/> Rotary <input type="checkbox"/> Jetted <input type="checkbox"/> _____	
Show exact location of well in section grid with "X". <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> </div> <div>           Bldg 243            Sketch map of well location. Showing property lines, roads and buildings.  </div> </div>					DRILLING FLUID <u>NONE.</u>			
PROPERTY OWNER'S NAME <u>MN. AIR NATIONAL GUARD</u> Mailing address if different than property address indicated above. <u>4680 Uper Street</u> <u>Duluth MN. 55811</u>					USE <input type="checkbox"/> Domestic <input checked="" type="checkbox"/> Monitoring <input type="checkbox"/> Heating/Cooling <input type="checkbox"/> Irrigation <input type="checkbox"/> Public <input type="checkbox"/> Industry/Commercial <input type="checkbox"/> Test Well <input type="checkbox"/> Dewatering <input type="checkbox"/> Remedial			
CASING <input type="checkbox"/> Steel      Drive Shoe? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/> Plastic <input type="checkbox"/> Threaded <input type="checkbox"/> Welded					HOLE DIAM. <u>8.0</u> in. to <u>17.0</u> ft.			
CASING DIAMETER <u>2"</u> in. to <u>5.0</u> ft.					WEIGHT <u>80</u> lbs./ft.			
SCREEN Make <u>Johnson</u> Type <u>sch 40 PVC</u> Slot/Gauge <u>.010</u> Set between <u>15.0</u> ft. and <u>5.0</u> ft.					OPEN HOLE from _____ ft. to _____ ft. Diam. <u>2"</u> Length <u>10.0</u> Set between <u>15.0</u> ft. and <u>5.0</u> ft. FITTINGS: <u>M/Fm. Flush</u>			
STATIC WATER LEVEL <u>6.0</u> ft. <input checked="" type="checkbox"/> below <input type="checkbox"/> above land surface      Date measured <u>5-11-95</u>					PUMPING LEVEL (below land surface) _____ ft. after _____ hrs. pumping _____ g.p.m.			
WELL HEAD COMPLETION <input type="checkbox"/> Pitless adapter manufacturer _____ Model _____ <input checked="" type="checkbox"/> Casing Protection <u>6" x 7' sch 40 steel</u> 12 in. above grade <u>3" x 4" x 7' steel guard posts</u>					GROUTING INFORMATION Well grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Grout Material <input checked="" type="checkbox"/> Neat cement <input type="checkbox"/> Bentonite <u>Bentonite</u> from <u>3 1/2'</u> to <u>2'</u> ft. _____ yds. _____ bags <u>concrete</u> from <u>2'</u> to <u>0'</u> ft. _____ yds. _____ bags from _____ to _____ ft. _____ yds. _____ bags			
NEAREST KNOWN SOURCE OF CONTAMINATION _____ feet _____ direction _____ type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No					PUMP <input checked="" type="checkbox"/> Not installed      Date installed _____ Manufacturer's name _____ Model number _____ HP _____ Volts _____ Length of drop pipe _____ ft. Capacity _____ g.p.m. Pressure Tank Capacity _____ Type: <input type="checkbox"/> Submersible <input type="checkbox"/> L.S. Turbine <input type="checkbox"/> Reciprocating <input type="checkbox"/> Jet <input type="checkbox"/> _____			
ABANDONED WELLS Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input type="checkbox"/> No					WELL CONTRACTOR CERTIFICATION This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.			
REMARKS, ELEVATION, SOURCE OF DATA, etc. <u>Amer. Can Engineering. Job # 95-7091</u> <u>El. by RREM. Inc.</u> <u>Top of Riser El. 1400.21</u> <u>Ground surface El. 1397.83</u>					<u>Amer. Can Engineering Testing MOD 3</u> Licensee Business Name _____ Lic. or Reg. No. _____ <u>J. S. [Signature]</u> <u>5-11-95</u> Authorized Representative Signature _____ Date _____ <u>JAMIE TOURIA</u> <u>5-11-95</u> Name of Driller _____ Date _____			
Use a second sheet, if needed					MINN. DEPT. OF HEALTH COPY 564550			

WELL LOCATION  
County Name  
ST. LOUIS

MINNESOTA DEPARTMENT OF HEALTH  
**WELL RECORD**  
Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO.

**564551**

Township Name DULUTH Township No. 50N Range No. 14W Section No. 6 Fraction N(1/2) S(1/2) N(1/2)

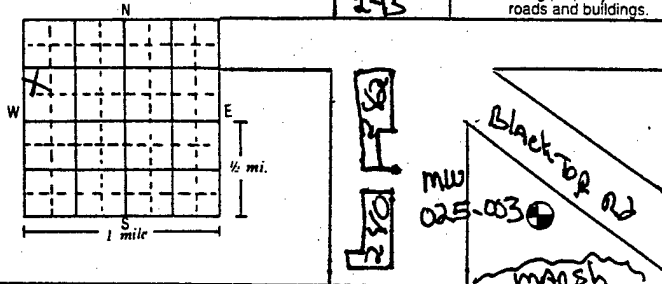
WELL DEPTH (completed) 17.2 ft. Date Work Completed 5-11-95

Numerical Street Address and City of Well Location  
4680 UPER STREET

DRILLING METHOD  
☐ Cable Tool ☐ Driven ☐ Dug  
☒ Auger ☐ Rotary ☐ Jetted

Show exact location of well in section grid with "X".  
085  
243

Sketch map of well location. Showing property lines, roads and buildings.



DRILLING FLUID  
NONE.

USE  
☐ Domestic ☒ Monitoring ☐ Heating/Cooling  
☐ Irrigation ☐ Public ☐ Industry/Commercial  
☐ Test Well ☐ Dewatering ☐ Remedial

CASING Drive Shoe? ☐ Yes ☒ No  
☐ Steel ☒ Threaded ☐ Welded  
☒ Plastic ☐ HOLE DIAM.

CASING DIAMETER WEIGHT  
2 in. to 7.2 ft. 8.0 in. to 22.0 ft.  
2 in. to 7.2 ft. 8.0 in. to 22.0 ft.  
2 in. to 7.2 ft. 8.0 in. to 22.0 ft.

PROPERTY OWNER'S NAME  
MN. NAT. GUARD.

SCREEN Make Johnson OPEN HOLE from 7.2 ft. to 17.2 ft.  
Type sch. 40. PVC. Diam. 2.0  
Slot/Gauze .010 Length 10.0  
Set between 17.2 ft. and 7.2 ft. FITTINGS: M/FM. Fltch.

Mailing address if different than property address indicated above.  
4680 UPER STREET  
DULUTH MN. 55811

STATIC WATER LEVEL  
12.7 ft. below ☒ above land surface Date measured 5-11-95

PUMPING LEVEL (below land surface)  
\_\_\_\_\_ ft. after \_\_\_\_\_ hrs. pumping \_\_\_\_\_ g.p.m.

GEOLOGICAL MATERIALS COLOR HARDNESS OF MATERIAL FROM TO  
Soil & Top So. 1 BROWN DENSE. 0 .3

WELL HEAD COMPLETION  
☐ Pitless adapter manufacturer \_\_\_\_\_ Model \_\_\_\_\_  
☒ Casing Protection 6' x 7' sch. 40 Steel ☐ 12 in. above grade

COBBLES & Boulders BROWN Med .3 13.0

GROUTING INFORMATION  
Well grouted? ☒ Yes ☐ No  
Grout Material ☒ Neat cement ☐ Bentonite

PEAT BROWN DENSE. 13.0 19.0

Bentonite from 7.6 to 4.0 ft. \_\_\_\_\_ yds. \_\_\_\_\_ bags  
CONCRETE from 4.0 to 0 ft. \_\_\_\_\_ yds. \_\_\_\_\_ bags

ORGANIC S.H. BROWN Loose 19.0 22.0

NEAREST KNOWN SOURCE OF CONTAMINATION  
\_\_\_\_\_ feet \_\_\_\_\_ direction \_\_\_\_\_ type

W SAND & GRAVEL BROWN Loose 19.0 22.0

Well disinfected upon completion? ☐ Yes ☐ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

PUMP  
☒ Not installed Date installed \_\_\_\_\_  
Manufacturer's name \_\_\_\_\_  
Model number \_\_\_\_\_ HP \_\_\_\_\_ Volts \_\_\_\_\_  
Length of drop pipe \_\_\_\_\_ ft. Capacity \_\_\_\_\_ g.p.m.  
Pressure Tank Capacity \_\_\_\_\_  
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ \_\_\_\_\_

REMARKS, ELEVATION, SOURCE OF DATA, etc.

ABANDONED WELLS  
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

REMARKS, ELEVATION, SOURCE OF DATA, etc.

WELL CONTRACTOR CERTIFICATION  
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

AMERICAN Engineering Testing MO063  
Licensee Business Name Lic. or Reg. No.

REMARKS, ELEVATION, SOURCE OF DATA, etc.

JAMIE TOURIA 5-11-95  
Name of Driller Date

REMARKS, ELEVATION, SOURCE OF DATA, etc.

HE-01205-04 (Rev. 5/92)

REMARKS, ELEVATION, SOURCE OF DATA, etc.

HE-01205-04 (Rev. 5/92)

REMARKS, ELEVATION, SOURCE OF DATA, etc.

HE-01205-04 (Rev. 5/92)

REMARKS, ELEVATION, SOURCE OF DATA, etc.

HE-01205-04 (Rev. 5/92)

REMARKS, ELEVATION, SOURCE OF DATA, etc.

HE-01205-04 (Rev. 5/92)

REMARKS, ELEVATION, SOURCE OF DATA, etc.

HE-01205-04 (Rev. 5/92)

REMARKS, ELEVATION, SOURCE OF DATA, etc.

HE-01205-04 (Rev. 5/92)

REMARKS, ELEVATION, SOURCE OF DATA, etc.

HE-01205-04 (Rev. 5/92)

WELL LOCATION  
County Name  
ST. LOUIS

MINNESOTA DEPARTMENT OF HEALTH  
**WELL RECORD**  
Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO.

**564552**

Township Name Duluth Township No. 504 Range No. 15W Section No. 1 Fraction NE 1/4 NE 1/4 SE 1/4

WELL DEPTH (completed) 24.2 ft. Date Work Completed 5-5-95

Numerical Street Address and City of Well Location  
MIL. A.R. NATIONAL Guard Base (Duluth)

DRILLING METHOD  
☐ Cable Tool ☐ Driven ☐ Dug  
☒ Auger ☐ Rotary ☐ Jetted

Show exact location of well in section grid with "X"  
  
Sketch map of well location. Showing property lines, roads and buildings.

DRILLING FLUID  
None

USE  
☐ Domestic ☒ Monitoring ☐ Heating/Cooling  
☐ Irrigation ☐ Public ☐ Industry/Commercial  
☐ Test Well ☐ Dewatering ☐ Remedial

CASING Drive Shoe? ☐ Yes ☒ No  
☐ Steel ☒ Threaded ☐ Welded  
☒ Plastic ☐ \_\_\_\_\_

CASING DIAMETER WEIGHT  
2.0 in. to 14.2 ft. \_\_\_\_\_ lbs./ft. 8.0 in. to 26.0 ft.  
\_\_\_\_\_ in. to \_\_\_\_\_ ft. \_\_\_\_\_ lbs./ft. \_\_\_\_\_ in. to \_\_\_\_\_ ft.  
\_\_\_\_\_ in. to \_\_\_\_\_ ft. \_\_\_\_\_ lbs./ft. \_\_\_\_\_ in. to \_\_\_\_\_ ft.

PROPERTY OWNER'S NAME  
MIL. A.R. NATIONAL Guard.

Mailing address if different than property address indicated above.  
4680 Viper Street  
Duluth MN. 55811

SCREEN Make Johnson OPEN HOLE from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
Type Sch 40 Pipe Diam. 2"  
Slot/Gauze .010 Length 10'  
Set between 24.2 ft. and 14.2 ft. FITTINGS: 1 1/2" F.W. Flange

GEOLOGICAL MATERIALS COLOR HARDNESS OF MATERIAL FROM TO

Black Top \_\_\_\_\_ 0 .4  
Sandy Silt & Gravel Brown Dense .4 -  
Fill to 3' changed to sandy s.s. 17.0 26.0

Sandy s.s. & gravel Brown med 17.0 26.0  
some Gravel Dense

STATIC WATER LEVEL  
17.2 ft. ☒ below ☐ above land surface Date measured 5-5-95

PUMPING LEVEL (below land surface)  
\_\_\_\_\_ ft. after \_\_\_\_\_ hrs. pumping \_\_\_\_\_ g.p.m.

WELL HEAD COMPLETION  
☐ Pitless adapter manufacturer \_\_\_\_\_ Model \_\_\_\_\_  
☒ Casing Protection 4x4 Concrete Pipe 2 in. above grade  
AT-Grade Manhole

GROUTING INFORMATION  
Well grouted? ☒ Yes ☐ No  
Grout Material ☒ Neat cement ☒ Bentonite  
Bentonite from 11.7 to 9.7 ft. \_\_\_\_\_ yds. \_\_\_\_\_ bags  
Neat cement from 9.7 to 4.0 ft. \_\_\_\_\_ yds. \_\_\_\_\_ bags  
Concrete from 4.0 to 0 ft. \_\_\_\_\_ yds. \_\_\_\_\_ bags

NEAREST KNOWN SOURCE OF CONTAMINATION  
\_\_\_\_\_ feet \_\_\_\_\_ direction \_\_\_\_\_ type  
Well disinfected upon completion? ☐ Yes ☐ No

PUMP  
☒ Not installed Date installed \_\_\_\_\_  
Manufacturer's name \_\_\_\_\_  
Model number \_\_\_\_\_ HP \_\_\_\_\_ Volts \_\_\_\_\_  
Length of drop pipe \_\_\_\_\_ ft. Capacity \_\_\_\_\_ g.p.m.  
Pressure Tank Capacity \_\_\_\_\_  
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐ \_\_\_\_\_

ABANDONED WELLS  
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

WELL CONTRACTOR CERTIFICATION  
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725.  
The information contained in this report is true to the best of my knowledge.

American Engineering Testing Mobile 3  
Licensee Business Name \_\_\_\_\_ Lic. or Reg. No. \_\_\_\_\_  
Th. S. J. \_\_\_\_\_ 6-12-8  
Authorized Representative Signature Date  
JAMIE TUORA \_\_\_\_\_ 5-5-95  
Name of Driller Date

REMARKS, ELEVATION, SOURCE OF DATA, etc.  
AMERICAN Engineering Job #85-7091  
El. By RREM INC.  
Top of Riser. El. 1424.62.  
Ground surface. El. 1424.69

WELL LOCATION  
County Name ST. LOUIS

MINNESOTA DEPARTMENT OF HEALTH  
**WELL RECORD**  
Minnesota Statutes Chapter 103I

MINNESOTA UNIQUE WELL NO.

**564553**

Township Name Duluth Township No. 50N Range No. 15W Section No. 1 Fraction SW. SE. NE.

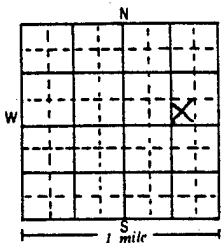
WELL DEPTH (completed) 19.4 ft. Date Work Completed 5-8-95

Numerical Street Address and City of Well Location  
MN. Air Guard Base. (Duluth)

DRILLING METHOD  
☐ Cable Tool ☐ Driven ☐ Dug  
☒ Auger ☐ Rotary ☐ Jetted

Show exact location of well in section grid with "X"

DRILLING FLUID  
NONE.



Sketch map of well location. Showing property lines, roads and buildings.

USE  
☐ Domestic ☒ Monitoring ☐ Heating/Cooling  
☐ Irrigation ☐ Public ☐ Industry/Commercial  
☐ Test Well ☐ Dewatering ☐ Remedial

CASING Drive Shoe? ☐ Yes ☒ No  
☐ Steel ☒ Threaded ☐ Welded  
☒ Plastic ☐

PROPERTY OWNER'S NAME  
MN. Air National Guard

HOLE DIAM.  
8.0 in. to 22.0 in.

CASING DIAMETER 2" 9.4 ft. WEIGHT 8.0 lbs./ft. 22.0 lbs./ft.

Mailing address if different than property address indicated above.  
4686 U.P.E.R STREET  
Duluth MN. 55811

SCREEN Make Johnson OPEN HOLE from 19.4 ft. to 9.4 ft.  
Type Sch 40. P.C. Diam. 2"  
Slot/Gauze 10 Length 10'  
Set between 19.4 ft. and 9.4 ft. FITTINGS: M/FM Flush

STATIC WATER LEVEL 13.7 ft. ☒ below ☐ above land surface Date measured 5-8-95

PUMPING LEVEL (below land surface) \_\_\_\_\_ ft. after \_\_\_\_\_ hrs. pumping \_\_\_\_\_ g.p.m.

GEOLOGICAL MATERIALS	COLOR	HARDNESS OF MATERIAL	FROM	TO
<u>Silty LOAM.</u>	<u>DARK</u>			
<u>ORGANIC SILT</u>	<u>BROWN</u>		<u>0</u>	<u>.6</u>
<u>SILT SAND. w/Gravel</u>				
<u>+Cobbles - Feco Balls</u>	<u>BROWN</u>		<u>.6</u>	<u>22.0</u>
<u>Wet Fray. 9' layer</u>				
<u>of sand w/ some silt +</u>				
<u>Gravel From 18'</u>				

WELL HEAD COMPLETION  
☐ Pileless adapter manufacturer \_\_\_\_\_ Model \_\_\_\_\_  
☒ Casing Protection 6" x 1' sch 40 steel 12 in. above grade  
3-4" x 7-steel guard 16.55

GROUTING INFORMATION  
Well grouted? ☒ Yes ☐ No  
Grout Material 1/2" cement Bentonite  
Barbwire from 6.4 to 4.4 ft. ☐ yds. ☐ bags  
CONCRETE from 4.0 to 0 ft. ☐ yds. ☐ bags

NEAREST KNOWN SOURCE OF CONTAMINATION \_\_\_\_\_ feet \_\_\_\_\_ direction \_\_\_\_\_ type  
Well disinfected upon completion? ☐ Yes ☐ No

PUMP  
☒ Not installed Date installed \_\_\_\_\_  
Manufacturer's name \_\_\_\_\_  
Model number \_\_\_\_\_ HP \_\_\_\_\_ Volts \_\_\_\_\_  
Length of drop pipe \_\_\_\_\_ ft. Capacity \_\_\_\_\_ g.p.m.  
Pressure Tank Capacity \_\_\_\_\_  
Type: ☐ Submersible ☐ L.S. Turbine ☐ Reciprocating ☐ Jet ☐

ABANDONED WELLS  
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

WELL CONTRACTOR CERTIFICATION  
This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.

AMERICAN Engineering, Testing, MO663  
Licensee Business Name \_\_\_\_\_ Lic. or Reg. No. \_\_\_\_\_  
J. S. Smith 6-12-75  
Authorized Representative Signature \_\_\_\_\_ Date \_\_\_\_\_  
JAMIE TURNER 5-8-95  
Name of Driller \_\_\_\_\_ Date \_\_\_\_\_

REMARKS, ELEVATION, SOURCE OF DATA, etc.  
AMERICAN ENGINEERING JOB # 95-7091  
EL. BY RREM INC.  
TOP OF RISER EL. 1424.28  
GROUND SURFACE EL. 1421.90  
MINN. DEPT. OF HEALTH COPY **564553**

## WELL LOCATION

County Name

ST. Louis

MINNESOTA DEPARTMENT OF HEALTH

## WELL RECORD

Minnesota Statutes Chapter 1031

MINNESOTA UNIQUE WELL NO.

564554

Township Name  
DuluthTownship No.  
50 NRange No.  
15 WSection No.  
1Fraction  
SE 1/4 SE NE

WELL DEPTH (completed)

15.5

ft.

Date Work Completed

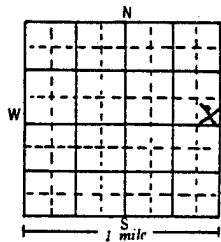
5-6-95

Numerical Street Address and City of Well Location

MN. AIR Guard Base (Duluth)

or Fire Number

Show exact location of well in section grid with "X".



Sketch map of well location. Showing property lines, roads and buildings.

Ground House  
x x  
Aires Rd.  
N

PROPERTY OWNER'S NAME

MN. AIR NATIONAL Guard

Mailing address if different than property address indicated above.

4680 Viper Street  
Duluth MN. 55811

## DRILLING METHOD

☐ Cable Tool☐ Driven☐ Dug☒ Auger☐ Rotary☐ Jetted

## DRILLING FLUID

None

## USE

☐ Domestic☒ Monitoring☐ Heating/Cooling☐ Irrigation☐ Public☐ Industry/Commercial☐ Test Well☐ Dewatering☐ Remedial

## CASING

☐ Steel☒ Plastic

Drive Shoe?

☐ Yes☒ No

Threaded

☐ Welded

## HOLE DIAM.

## CASING DIAMETER

2.0

in. to 5.5

## WEIGHT

8.0

in. to 17.0

## SCREEN

Make

Johnson

Type

Sch 40 PVC

Slot/Gauze

.010

Set between

15.5 ft. and 5.5 ft.

## OPEN HOLE

from

ft. to

Diam.

2"

Length

10'

Fittings:

M/FM Hosh

GEOLOGICAL MATERIALS

COLOR

HARDNESS OF MATERIAL

FROM

TO

Top So. l. s. Hy Lamin

DARK

ORGANIC

Brown

Sandy s. Hy Lamin

Brown

Cobbles + Boulders

Brown

4' to 5'

## STATIC WATER LEVEL

6.2

ft. below

☐ above land surface

Date measured

5-6-95

## PUMPING LEVEL (below land surface)

ft. after

hrs. pumping

g.p.m.

## WELL HEAD COMPLETION

☐ Pitless adapter manufacturer☒ Casing Protection

6" x 7" Sch 40 Steel 12 in. above grade

## GROUTING INFORMATION

Well grouted?

☒ Yes ☐ No

Grout Material

Neat cement

☒ Bentonite

Bentonite

from 4.0

to 2.5

ft.

Cement

from 2.5

to 0

ft.

☐ yds. ☐ bags☐ yds. ☐ bags☐ yds. ☐ bags

## NEAREST KNOWN SOURCE OF CONTAMINATION

feet

direction

type

Well disinfected upon completion? ☐ Yes ☐ No

## PUMP

☒ Not installed

Date installed

Manufacturer's name

Model number

HP

Volts

Length of drop pipe

ft.

Capacity

g.p.m.

Pressure Tank Capacity

Type: ☐ Submersible☐ L.S. Turbine☐ Reciprocating☐ Jet☐

## ABANDONED WELLS

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

## WELL CONTRACTOR CERTIFICATION

This well was drilled under my supervision and in accordance with Minnesota Rules, Chapter 4725.

The information contained in this report is true to the best of my knowledge.

AMERICAN Engineering Testing Model 3

Licensee Business Name

Lic. or Reg. No.

J. S. 25 6-12-95

Authorized Representative Signature

Date

JAMIE TUORA 5-6-95

Name of Driller

Date

REMARKS, ELEVATION, SOURCE OF DATA, etc.

AMERICAN Engineering. Job #95-7091  
El. By RREM INC.  
Top of Riser. El. 1422.90  
Ground surface. El. 1420.44

MINN. DEPT. OF HEALTH COPY

564554

HE-01205-04 (Rev. 5/92)



## **APPENDIX D**

### **WELL DEVELOPMENT, PURGING, AND SAMPLING LOGS**

## INTRODUCTION

This appendix contains the well development, purging, and sampling logs for the monitor wells installed during the Site Investigation for IRP Sites No. 25 and No. 26 at the Minnesota Air National Guard Base, Duluth, Minnesota.

**THIS PAGE INTENTIONALLY LEFT BLANK**

## Well Development Log

Installation: Duluth ANGB

Well No.: 025-001MW

Client/Project:

Site: 25

Sample Start: (Date) 12 May 95

(Time): 1030

Sample End: (Date) 12 May 95

(Time): 1236

Developed By: J. Byrd, G. Wirtz

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 21.78'

Depth to Bottom of Well (BTOC): 38.32'

Volume of Water in Well (gallons) = (0/0408) x (well diameter (feet)<sup>2</sup> x height of water column (feet) (16.54') (0.1632) = 2.7 gal.

Volume of Water in Well x 3 = 8.1 gal.

Development method: PVC Bailer (1st 7.5 gal.) stainless-steel submersible pump thereafter.

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: 70s, Sunny, Breezy.

Comments: Very silty, causing problems with stainless-steel submersible pump.  
Never did clear up.

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (μS/cm)	Clarity (NTU)	Remarks
1053	7.5	12°	7.38	6.05		Cloudy
1104	10.0	12°	7.68	6.31		Cloudy
1110	12.5	12°	7.61	7.43		Cloudy
1122	15.0	12°	7.75	6.90		Cloudy
1130	17.5	12°	7.65	6.95		Cloudy
1137	20.0	12°	7.64	5.79		Cloudy
1145	22.5	12°	7.75	5.55		Cloudy
1153	25.0	12°	7.69	6.06		Cloudy
1201	27.5	12°	7.66	6.15		Cloudy
1208	30.0	12°	7.66	6.34		Cloudy
1215	32.5	12°	7.60	6.39		Cloudy
1222	35.0	12°	7.71	6.25		Cloudy
1231	37.5	12°	7.71	6.74	640,000	Cloudy

° C – Degrees Centigrade.

NTU – Nephelometer Turbidity Units.

μS/cm – microSiemens per centimeter.

pH – [p(otential) of H(ydrogen)].

## Well Development Log

Installation: Duluth ANGB

Well No.: 025-002MW

Client/Project:

Site: 25

Sample Start: (Date) 12 May 95

(Time): 1308

Sample End: (Date) 12 May 95

(Time): 1513

Developed By: J. Byrd, G. Wirtz

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 7.49'

Depth to Bottom of Well (BTOC): 15.98'

Volume of Water in Well (gallons) =  $(0/0408) \times (\text{well diameter (feet)}^2 \times \text{height of water column (feet)}) (8.49') (0.1632) = 1.4 \text{ gal.}$

Volume of Water in Well  $\times 3 = 4.2 \text{ gal.}$

Development method: PVC Bailer.

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Partly cloudy, windy, cool.

Comments: Recharges slowly.

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (µS/cm)	Clarity (NTU)	Remarks
1321	4	8°	6.93	11.18		Very Cloudy
1332	6	8°	6.83	12.33		Clearing
1345	8	8°	6.65	12.27		Clearing
1355	10	8°	6.64	12.19	644,000	Silty, Cloudy
1405	12	8°	6.60	12.16	657,000	Silty, Cloudy
1415	14	8°	6.59	12.15		Silty, Cloudy
1425	16	8°	6.62	12.98	405,000	Silty, Cloudy
1435	18	8°	6.67	12.22	683,000	Silty, Cloudy
1444	20	8°	6.62	12.33		Silty, Cloudy
1454	22	8°	6.63	12.32		Silty, Cloudy
1503	24	8°	6.72	11.85		Silty, Cloudy
1510	26	8°	6.65	12.18		Silty, Cloudy

° C – Degrees Centigrade.

NTU – Nephelometer Turbidity Units.

µS/cm – microSiemens per centimeter.

pH – [p(otential) of H(ydrogen)].

## Well Development Log

Installation: Duluth ANGB

Well No.: 025-003MW

Client/Project:

Site: 25

Sample Start: (Date) 12 May 95

(Time): 1530

Sample End: (Date) 12 May 95

(Time): 1735

Developed By: J. Byrd, G. Wirtz

Background PID Reading: 0.0 ppm

PID Reading: 80.0 ppm

Depth to Water (BTOC): 10.10'

Depth to Bottom of Well (BTOC): 21.94'

Volume of Water in Well (gallons) = (0/0408) x (well diameter (feet)<sup>2</sup> x height of water column (feet) (11.84') (0.1632) = 1.9 gal.

Volume of Water in Well x 3 = 5.8 gal.

Development method: PVC Bailer.

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Partly cloudy, breezy (10-15 mph), cool.

Comments: Recharging slowly.

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (µS/cm)	Clarity (NTU)	Remarks
	6					
1547	8	9°	6.64	14.72		Very Cloudy
1559	10	9°	6.48	15.20		Very Cloudy
1610	12	9°	6.47	15.10		Very Cloudy
1617	14	9°	6.37	15.03		Very Cloudy
1627	16	9°	6.47	14.87		Very Cloudy
1638	18	9°	6.33	15.08		Very Cloudy
1650	20	9°	6.44	15.32	180,000	Clearing
1701	22	9°	6.37	15.26		Clearing
1717	24	9°	6.40	15.41		Clearing
1729	26	9°	6.39	15.89	175,000	Clearing

° C - Degrees Centigrade.

NTU - Nephelometer Turbidity Units.

µS/cm - microSiemens per centimeter.

pH - [p(otential) of H(ydrogen)].

## Well Development Log

Installation: Duluth ANGB

Well No.: 026-001MW

Client/Project:

Site: 25

Sample Start: (Date) 10 May 95

(Time): 10:49 am

Sample End: (Date)

(Time): 11:55 am

Developed By: J. Byrd, Gary Wirtz

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 17.34'

Depth to Bottom of Well (BTOC): (24.2') 23.89'

Volume of Water in Well (gallons) = (0/0408) x (well diameter (feet)<sup>2</sup> x height of water column (feet) (6.55') (0.1632) = 1.07 gal. = 1.1 gal.

Volume of Water in Well x 3 = 3.3 gal.

Development method: PVC Bailer (1st 5 gals.) (Stainless-steel submersible pump thereafter).

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Cloudy, 45° F, Wind 10 mph N.

Comments: Water Level: 19.11' (BTOC) after development.

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (μS/cm)	Clarity (NTU)	Remarks
1057	3	7°	8.06	4.18		Cloudy
1103	4	7°	7.91	4.51		Cloudy
1105	5	7°	7.72	4.74	698	Cloudy
1115	7	7°	7.64	5.13		Cloudy
1117	8	7°	7.63	4.50		Cloudy
1122	9	7°	7.62	5.42	477	Cloudy
1134	10	7°	7.41	5.51	688	Cloudy
1137	11	7°	7.39	5.14		Cloudy
1140	12	7°	7.35	5.13	39	Cloudy
1143	13	7°	7.34	5.38	522	Cloudy
1145	14	7°	7.34	5.26	469	Cloudy
1147	15	7°	7.31	5.13		Cloudy
1150	16	7°	7.32	5.31	236	Cloudy

(Concluded on next page)

**Well Development Log (Concluded)**  
**Well No.: 026-001MW**  
**Duluth ANGB**

Ending Water Level: 18.4 (BTOC) and Rising.

Comment: Stainless-steel submersible pumps dry in a matter of seconds on lowest setting. We pump, grab samples for peramiters, and allow to recharge. Reached two-hour limit.

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity ( $\mu$ S/cm)	Clarity (NTU)	Remarks
1153	17	7°	7.36	5.56	680	Cloudy
1330	18	7°	7.83	5.33	694	Cloudy
1333	20	7°	7.63	4.77		Cloudy
1337	22	7°	7.51	4.60	112	Clearing
1345	23	7°	7.63	4.64	51	Clearing
1350	24	7°	7.48	4.71	32	Clearing
1355	25	7°	7.46	4.69	35	
1400	26	7°	7.39	4.62	38	
1405	27	7°	7.40	4.75	57	
1411	28	7°	7.42	4.66	35	
1416	29	7°	7.42	4.68	25.7	NTU (x100)
1421	30	7°	7.41	4.71	21.1	NTU (x100)
1426	31	7°	7.41	4.73	31.9	NTU (x100)
1431	32	7°	7.33	4.81	32.5	NTU (x100)
1436	33	7°	7.34	4.72	12.7	NTU (x100)

° C – Degrees Centigrade.

NTU – Nephelometer Turbidity Units.

$\mu$ S/cm – microSiemens per centimeter.

pH – [p(otential) of H(ydrogen)].



## Well Development Log

Installation: Duluth ANGB

Well No.: 026-002MW

Client/Project:

Site: 26

Sample Start: (Date) 10 May 95

(Time): 1506

Sample End: (Date) 10 May 95

(Time): 1710

Developed By: J. Byrd, Gary Wirtz

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 11.07'

Depth to Bottom of Well (BTOC): (19.4') 21.40'

Volume of Water in Well (gallons) =  $(0/0408) \times (\text{well diameter (feet)}^2 \times \text{height of water column (feet)})$   
 $(10.33') (0.1632) = 1.7 \text{ gal.}$

Volume of Water in Well x 3 = 5.1 gal.

Development method: PVC Bailer (1st 15 gals.) (Stainless-steel submersible pump).

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Cloudy, 45° F, Wind 10 mph N.

Comments: Recal Hydac when pH drops below 7. Water level at 1710: 11.21' (BTOC) and rising.

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (µS/cm)	Clarity (NTU)	Remarks
1516	5	7°	7.24	3.2		Very Cloudy
1520	7	7°	7.04	2.9		Very Cloudy
1523	9	7°	6.94	2.86		Very Cloudy
1538	11	7°	6.45	2.86		Very Cloudy
1541	13	7°	6.53	2.87		Very Cloudy
1545	15	7°	6.55	2.88		Very Cloudy
1553	16.7	7°	6.62	3.05	788,000	Very Cloudy
1557	18.4	7°	6.73	3.13		Very Cloudy
1601	20.1	7°	6.65	2.99		Very Cloudy
1604	21.8	7°	6.65	2.98		Very Cloudy
1609	23.5	7°	6.80	3.16		Clearing

(Concluded on next page)

# Well Development Log (Concluded)

Well No.: 026-002MW

Duluth ANGB

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (μS/cm)	Clarity (NTU)	Remarks
1613	25.2	7°	6.74	3.09	679,000	Clearing
1617	26.9	7°	6.68	3.18	445,000	Clearing
1621	28.6	7°	6.68	3.09	356,000	
1625	30.3	7°	6.63	3.14	293,000	
1629	32.0	7°	6.66	3.22	249,000	
1633	33.7	7°	6.68	3.17	260,000	
1637	35.4	7°	6.63	3.02	400,000	
1641	37.1	7°	6.60	3.11	278,000	
1645	38.8	7°	6.65	3.07	248,000	
1649	40.5	7°	6.67	3.04	649,000	
1653	42.2	7°	6.67	3.07	380,000	
1657	43.9	7°	6.68	3.05	275,000	
1701	45.6	7°	6.67	4.39	208,000	
1705	47.3	7°	6.62	3.07	232,000	
1709	49.0	7°	6.63	3.05	229,000	

° C – Degrees Centigrade.

NTU – Nephelometer Turbidity Units.

μS/cm – microSiemens per centimeter.

pH – [p(otential) of H(ydrogen)].

## Well Development Log

Installation: Duluth ANGB

Well No.: 026-003MW

Client/Project:

Site: 26

Sample Start: (Date) 12 May 95

(Time): 0728

Sample End: (Date) 12 May 95

(Time): 0938

Developed By: J. Byrd, Gary Wirtz

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 8.29'

Depth to Bottom of Well (BTOC): (15.5') 16.15'

Volume of Water in Well (gallons) = (0/0408) x (well diameter (feet)<sup>2</sup> x height of water column (feet) (7.86') (0.1632) = 1.3 gal.

Volume of Water in Well x 3 = 3.9 gal.

Development method: PVC Bailer.

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Sunny, High in the 70s, Breeze 10-15 mph 5.

Comments: Bails dry (almost) 5-6 bailers.

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (μS/cm)	Clarity (NTU)	Remarks
0754	5	7°	7.49	4.30		Cloudy
0816	7.5	7°	7.05	3.94		Clearing
0829	10	7°	6.84	3.83	699,000	
0844	12.0	7°	6.39	3.99	201,000	
0850	13.0	7°	6.56	3.68	85,000	
0856	14.0	7°	6.48	3.88	112,000	
0902	15.0	7°	6.48	3.69	110,000	
0908	16.0	7°	6.46	3.64	184,000	
0914	17.0	7°	6.42	3.70	61,000	
0920	18.0	7°	6.47	3.71	199,000	
0926	19.0	7°	6.48	3.71	109,000	
0934	20.0	7°	6.49	3.71	119,000	

° C - Degrees Centigrade.

NTU - Nephelometer Turbidity Units.

μS/cm - microSiemens per centimeter.

pH - [p(otential) of H(ydrogen)].

## Well Purging Log

Installation: Duluth ANGB

Well No.: 025-001MW

Client/Project:

Site: 25

Sample Start: (Date) 19 May 95

(Time): 1315

Sample End: (Date) 19 May 95

(Time): 1420

Developed By: Byrd, Greenway

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 21.74'

Depth to Bottom of Well (BTOC): 39.28'

Volume of Water in Well (gallons) =  $(0/0408) \times (\text{well diameter (feet)}^2 \times \text{height of water column (feet)}) (17.54') (0.1632) = 2.9 \text{ gal.}$

Volume of Water in Well x 3 = 8.6 gal.

Development method: Teflon™ Bailer.

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Sunny, 70s.

Comments:

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (μS/cm)	Clarity (NTU)	Remarks
1353	9	9°	7.60	9.39		Cloudy
1400	12	9°	7.68	8.13		Cloudy
1409	15	9°	7.73	8.08		Cloudy
1417	18	9°	7.74	8.02		Cloudy

° C – Degrees Centigrade.

NTU – Nephelometer Turbidity Units.

μS/cm – microSiemens per centimeter.

pH – [p(otential) of H(ydrogen)].

## Well Purging Log

Installation: Duluth ANGB

Well No.: 025-002MW

Client/Project:

Site: 25

Sample Start: (Date) 18 May 95

(Time): 1530

Sample End: (Date) 18 May 95

(Time): 1628

Developed By: Byrd, Greenway

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 7.32'

Depth to Bottom of Well (BTOC): 18.80'

Volume of Water in Well (gallons) =  $(0/0408) \times (\text{well diameter (feet)}^2 \times \text{height of water column (feet) (11.48') (0.1632)} = 1.9 \text{ gal.}$

Volume of Water in Well x 3 = 5.6 gal.

Development method: Teflon™ Bailer.

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Sunny, 60s.

Comments:

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (µS/cm)	Clarity (NTU)	Remarks
1549	6	7°	6.80	12.12		
1602	8	7°	7.22	11.57		Slow Recharge
1613	10	7°	7.25	11.54		
1626	12	7°	7.21	11.45		

° C – Degrees Centigrade.

NTU – Nephelometer Turbidity Units.

µS/cm – microSiemens per centimeter.

pH – [p(otential) of H(ydrogen)].

## Well Purging Log

Installation: Duluth ANGB

Well No.: 025-003MW

Client/Project:

Site: 25

Sample Start: (Date) 19 May 95

(Time): 1554

Sample End: (Date) 19 May 95

(Time): 1637

Developed By: Byrd, Greenway

Background PID Reading: 0.0 ppm

PID Reading: 17.0 ppm

Depth to Water (BTOC): 10.05'

Depth to Bottom of Well (BTOC): 22.35'

Volume of Water in Well (gallons) =  $(0/0408) \times (\text{well diameter (feet)}^2 \times \text{height of water column (feet)}) (12.30') (0.1632) = 2.0 \text{ gal.}$

Volume of Water in Well  $\times 3 = 6.0 \text{ gal.}$

Development method: Teflon™ Bailer.

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Sunny, 70s.

Comments:

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (μS/cm)	Clarity (NTU)	Remarks
1612	6	6°	6.65	16.17		Cloudy
1618	8	6°	6.64	14.12		Cloudy
1628	10	6°	6.67	14.07		Cloudy
1634	12	6°	6.61	14.13		Clearing

° C - Degrees Centigrade.

NTU - Nephelometer Turbidity Units.

μS/cm - microSiemens per centimeter.

pH - [p(otential) of H(ydrogen)].

## Well Purging Log

Installation: Duluth ANGB

Well No.: 026-001MW

Client/Project:

Site: 26

Sample Start: (Date) 18 May 95

(Time): 0840

Sample End: (Date) 18 May 95

(Time): 0932

Developed By: Byrd, Greenway

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 17.05'

Depth to Bottom of Well (BTOC): 25.28'

Volume of Water in Well (gallons) =  $(0/0408) \times (\text{well diameter (feet)}^2 \times \text{height of water column (feet)}) (8.23') (0.1632) = 1.3 \text{ gal.}$

Volume of Water in Well x 3 = 4.0 gal.

Development method: Bailer.

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Sunny, 50s, Breezy.

Comments: Depth at end: 17.2' (BTOC) and rising.

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (µS/cm)	Clarity (NTU)	Remarks
0856	4	7°	7.21	5.18		Cloudy
0859	5	7°	7.25	4.72		Cloudy
0902	6	7°	7.28	4.83		Cloudy
0906	7	7°	7.28	4.93		Cloudy
0910	8	7°	7.34	4.89		Cloudy
0914	9	7°	8.09	5.21		Cloudy
0918	10	7°	7.65	4.75		Cloudy
0921	11	7°	7.49	4.74		Cloudy
0923	12	7°	7.45	4.71		Cloudy
0927	13	7°	7.41	4.85		Cloudy

° C – Degrees Centigrade.

NTU – Nephelometer Turbidity Units.

µS/cm – microSiemens per centimeter.

pH – [p(otential) of H(ydrogen)].

## Well Purging Log

Installation: Duluth ANGB

Well No.: 026-002MW

Client/Project:

Site: 26

Sample Start: (Date) 18 May 95

(Time): 1044

Sample End: (Date) 18 May 95

(Time): 1125

Developed By: Byrd, Greenway

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 9.74'

Depth to Bottom of Well (BTOC): 21.44'

Volume of Water in Well (gallons) =  $(0/0408) \times (\text{well diameter (feet)}^2 \times \text{height of water column (feet) (11.7') (0.1632)} = 1.9 \text{ gal.}$

Volume of Water in Well x 3 = 5.7 gal.

Development method: Teflon™ Bailer.

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Sunny, 50s, Breezy.

Comments: Depth at end: 9.72' (BTOC).

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (μS/cm)	Clarity (NTU)	Remarks
1101	6	6°	7.40	3.04		Cloudy
1109	8	6°	7.27	2.62		Cloudy
1113	10	6°	7.17	2.61		Cloudy
1119	12	6°	7.16	2.58		Cloudy
1123	14	6°	7.13	2.60		Cloudy

° C – Degrees Centigrade.

NTU – Nephelometer Turbidity Units.

μS/cm – microSiemens per centimeter.

pH – [p(otential) of H(ydrogen)].



## Well Purging Log

Installation: Duluth ANGB

Well No.: 026-003MW

Client/Project:

Site: 26

Sample Start: (Date) 18 May 95

(Time): 1220

Sample End: (Date) 18 May 95

(Time): 1309

Developed By: Byrd, Greenway

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 7.20'

Depth to Bottom of Well (BTOC): 17.94'

Volume of Water in Well (gallons) =  $(0/0408) \times (\text{well diameter (feet)}^2 \times \text{height of water column (feet)})$   
 $(10.74') (0.1632) = 1.8 \text{ gal.}$

Volume of Water in Well  $\times 3 = 5.3 \text{ gal.}$

Development method: Teflon™ Bailer.

Development Water Containment: Plastic-lined, 55-gal. steel drum.

Average Rate of Removal of Water:

Weather: Sunny, 60s, Breezy.

Comments: Recharging slower than others.

Time	Amount of Water Removed (gallons)	Temperature (° C)	pH	Conductivity (µS/cm)	Clarity (NTU)	Remarks
1234	5	6°	6.97	7.18		Clear
1239	7	6°	6.96	3.93		Clear
1244	9	6°	6.97	3.76		Clear
1251	11	6°	6.97	3.89		Clear
1304	13	6°	6.95	3.82		Clear

° C – Degrees Centigrade.

NTU – Nephelometer Turbidity Units.

µS/cm – microSiemens per centimeter.

pH – [p(otential) of H(ydrogen)].

## Well Sampling Log

Installation: Duluth ANGB

Well No.: 025-001MW

Client/Project:

Site: 25

Sample Start: (Date) 19 May 95

(Time): 1503

Sample End: (Date) 19 May 95

(Time):

Sampled By: J. Byrd, D. Greenway

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 22.05'

Screen Interval:

Sampling Method: Teflon™ Bailer

Sampling Equipment Decontamination method: Liqui-Nox, Potable water rinse, DI Water Rinse.

### Lab Analyses:

VOCs – SW8010/8020

Metals – SW7421, SW6010, SW7196, SW7470

SVOCs – SW8270

### QA/QC Samples:

Weather: Sunny, 70s

### Comments:

## Well Sampling Log

Installation: Duluth ANGB

Well No.: 025-002MW

Client/Project:

Site: 25

Sample Start: (Date) 18 May 95

(Time): 1654

Sample End: (Date) 18 May 95

(Time): 1705

Sampled By: J. Byrd, D. Greenway

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 7.39'

Screen Interval:

Sampling Method: Teflon™ Bailer

Sampling Equipment Decontamination method: Liqui-Nox, Potable water rinse, DI Water Rinse.

### Lab Analyses:

VOCs – SW8260

SVOCs – SW8270

Metals – SW7421, SW6010, SW7196, SW7470

### QA/QC Samples:

Weather: Sunny, 60s, Breezy.

### Comments:

## Well Sampling Log

Installation: Duluth ANGB

Well No.: 025-003MW

Client/Project:

Site: 25

Sample Start: (Date) 19 May 95

(Time): 1706

Sample End: (Date) 19 May 95

(Time): 1720

Sampled By: J. Byrd, D. Greenway

Background PID Reading: 0.0 ppm

PID Reading: 8.0 ppm

Depth to Water (BTOC): 14.01'

Screen Interval:

Sampling Method: Teflon™ Bailer

Sampling Equipment Decontamination method:

### Lab Analyses:

SVOCs – SW8270

VOCs – SW8010, SW8020

Metals – SW7421, SW6010, SW7196, SW7470

### QA/QC Samples:

025-003RB @ 1532

025-003AMW @ 1715

### Weather:

### Comments:

## Well Sampling Log

Installation: Duluth ANGB

Well No.: 026-001MW

Client/Project:

Site: 26

Sample Start: (Date) 18 May 95

(Time): 1012

Sample End: (Date) 18 May 95

(Time): 1020

Sampled By: J. Byrd, D. Greenway

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC): 17.2'

Screen Interval:

Sampling Method: Teflon™ Bailer

Sampling Equipment Decontamination method: Liqui-Nox, Rinse with Potable Water, Rinse with DI Water.

### Lab Analyses:

SVOCs – SW8270

VOCs – SW8260

### QA/QC Samples:

SI – 001FB

Weather: Sunny, Breezy, 50s.

### Comments:

## Well Sampling Log

Installation: Duluth ANGB

Client/Project:

Sample Start: (Date) 18 May 95

Sample End: (Date) 18 May 95

Sampled By: J. Byrd, D. Greenway

Background PID Reading: 0.0 ppm

Depth to Water (BTOC): 9.74'

Screen Interval:

Sampling Method: Teflon™ Bailer

Sampling Equipment Decontamination method: Liqui-Nox, Rinse with Potable Water, Rinse with DI Water.

Well No.: 026-002MW

Site: 26

(Time): 1125

(Time): 1144

PID Reading: 0.0 ppm

### Lab Analyses:

VOCs – SW8260

SVOCs – SW8270

### QA/QC Samples:

None

Weather: Sunny, Breezy, 80s

### Comments:

## Well Sampling Log

Installation: Duluth ANGB

Well No.: 026-003MW

Client/Project:

Site: 26

Sample Start: (Date) 18 May 95

(Time): 1333

Sample End: (Date) 18 May 95

(Time): 1355

Sampled By: J. Byrd, D. Greenway

Background PID Reading: 0.0 ppm

PID Reading: 0.0 ppm

Depth to Water (BTOC):

Screen Interval:

Sampling Method: Teflon™ Bailer

Sampling Equipment Decontamination method: Liqui-Nox, Potable water rinse, DI water rinse.

### Lab Analyses:

VOCs – SW8260

SVOCs – SW8270

### QA/QC Samples:

026-003RB – taken at 1212

026-003AMW – 6W01

### Weather:

### Comments:

## **APPENDIX E**

### **AQUIFER SLUG TEST DATA ANALYSIS**



## E.1 INTRODUCTION

Six aquifer slug tests on six monitor wells were performed to investigate the hydraulic properties of the unconsolidated glacial till. A detailed description of the data collection and analysis is presented in the following sections.

The slug test method is used to obtain data necessary to calculate the hydraulic conductivity of the subsurface material around the screened portion of a well. The technique is based on measurements of the water level as a function of time after withdrawing a slug of known volume from the monitor well. Both rising-head and falling-head test methods were run on each well. However, only rising-head test data is used to evaluate and interpret the hydraulic properties of the aquifer at both IRP sites.

## E.2 AQUIFER SLUG TEST PROCEDURE

The equipment used for slug testing included a Hermit Environmental Data Logger model 1000C manufactured by *In Situ*, Inc., of Laramie, Wyoming. Also used was a pressure transducer model PTX-161, manufactured by *In Situ*, Inc. An acrylic slug that was 1.25 inches in diameter and 4 feet in length was used to produce the initial water displacement.

Prior to testing, the well was developed and the water level allowed to stabilize. The slug was decontaminated using standard procedures prior to performing the slug test.

Immediately upon opening, the headspace of the well to be slug tested was tested for volatile organic vapors and lower explosive limit and oxygen percentages using a photoionization detector and explosimeter respectively. Next, the initial water level was measured and recorded in the field logbook and the pressure transducer was placed in the well and allowed to equilibrate. The proper operating parameters such as time, date, test number, sample rate, number of inputs, data type, and scale factor and offset values of the transducer were inserted to properly program the data logger for the slug test. The decontaminated slug was rapidly lowered into the well in such a manner as to minimize turbulence and splashing. The injection of the slug created a nearly instantaneous rise in the water level or hydraulic head as well as some transient oscillations (minimized by the smooth slug injection). After the initial rise, the water level of the well dropped as it returned to equilibrium. The water level altitudes were recorded by the data logger.

After equilibrium was attained, the slug was rapidly and smoothly removed from the well and the subsequent rise of the water level in the well versus the time since the start of the test was also recorded by the data logger.

After the slug test was completed, the data was downloaded onto a computer and printed out by a portable printer.

### **E.3 SLUG TEST DATA ANALYSIS METHODS**

The method used for analysis of the slug test data depends on the setting of the monitor well being tested. For monitor wells in unconfined conditions, the Bouwer and Rice (1976) method is the appropriate method to use for reduction of the slug test data to determine values of hydraulic conductivity. The Bouwer and Rice method can also be used for semi-confined and confined conditions (Bouwer, 1989). Because of the heterogeneous nature of the lenticular stratigraphy and discontinuous layers of intermixed clays, silts, sands, and gravel which are representative of glacial stratigraphy, some uncertainty exists whether the hydrologic unit is defined as an unconfined, semi-confined, or confined aquifer.

The data plots and data reduction for both methods discussed in the previous paragraph were accomplished using the AQTESOLV software package Version 2.0 developed by Geraghty & Miller (1994).

The slug test data analyses using Bouwer and Rice (1976) method is presented in this section. The slug test results are presented in Section E.4.

The method described by Bouwer and Rice (1976) is used to calculate the hydraulic conductivity of an aquifer or hydrologic unit in the vicinity of a well screen from the rate of rise or fall of the water level or hydraulic head in the well after a known volume or "slug" is suddenly injected or withdrawn. This particular method is based on the following assumptions: (1) drawdown of the water table around the well is negligible, (2) flow above the water table (in the capillary fringe) can be ignored, (3) head losses as water enters the well (well losses) are negligible, and (4) the aquifer is homogeneous and isotropic.

The rate of flow of groundwater into a well after the water level has been lowered a distance,  $y$ , below the static water table around the well is calculated using the Thiem equation (Equation 1).

$$Q = 2\pi KL \frac{y}{\ln(R_e/r_w)}, \text{ where} \quad (1)$$

Where:

- $Q$  = rate of flow into the well;
- $\pi$  = 3.14159, the ratio of the circumference to the diameter of a circle.
- $K$  = hydraulic conductivity of the hydrologic unit in the vicinity of the well screen;
- $L$  = length of screened interval;
- $y$  = vertical difference between water level inside the well and the static water level outside the well;
- $R_e$  = effective radial distance over which  $y$  is dissipated; and
- $r_w$  = radial distance to the undisturbed portion of the hydrologic unit from the centerline of the well.

The value of  $r_w$  is the radius of the screened section of the well plus the thickness of the sand pack and the developed zone around the well. Because the take only the thickness of the sand pack into account (Bouwer, 1989).

The rate of rise of the water level ( $dy/dt$ ) in the well after the water level has been quickly lowered can be regarded as:

$$\frac{dy}{dt} = \frac{-Q}{\pi r_c^2} \quad (2)$$

- $dy/dt$  = rate of rise of the water level within the well;
- $Q$  = volume rate of flow into well;
- $\pi$  = 3.14159, the ratio of the circumference to the diameter of a circle; and
- $r_c$  = radius of the casing.

If the water level rises in the screened section of the well with a sand pack around it, then the thickness and porosity of the sand pack should be taken into account when calculating the equivalent value of  $r_c$  for the rising water level. The equivalent value of  $r_c$  is then calculated using Equation (3) if the water level is within the screened interval of the well.

$$r_c = [(1 - n)r_c^2]^{1/2}, \text{ where} \quad (3)$$

- $n$  = porosity of the sand pack;
- $r_c$  = radius of the casing;
- $r_w$  = radius distance to the undisturbed portion of the aquifer from the centerline of the well.

By solving Equation (2) for  $Q$ , and using it in Equation (1), it is possible to integrate, and solve for hydraulic conductivity,  $K$ , in Equation (4).

$$K = r_c^2 \ln \frac{(R_e/r_w)}{2L} \frac{1}{t} \ln \frac{y_o}{y_t}, \text{ where} \quad (4)$$

- $K$  = Hydraulic conductivity;
- $r_c$  = radius of casing;
- $R_e$  = effective radial distance over which  $y$  is dissipated;
- $r_w$  = radial distance to the undisturbed portion of the aquifer from the centerline of the well;
- $y_o$  =  $y$  at time zero; and
- $y_t$  =  $y$  at time  $t$ .

This equation was used to calculate hydraulic conductivity of the sediments of Site 10.

Values of  $R_e$ , effective radius, for various system geometries are expressed in terms of the dimensionless ratio  $\ln(R_e/r_w)$  and were determined empirically with an electrical resistance network analog for different values of  $r_w$ ,  $L$ , length of water column in the well,  $H$ , and hydrologic unit thickness,  $b$ , (Bouwer and Rice, 1976). The data are used in one of two equations: Equation (5) is used when  $H$  is less than  $b$ , and Equation (6) when  $H$  is equal to  $b$ . These equations are:

$$\ln \frac{R_e}{r_w} = \left[ \frac{1.1}{\ln(H/r_w)} + \frac{A + B \ln[(b - H)/r_w]}{L/r_w} \right]^{-1}, \text{ and} \quad (5)$$

$$\ln \frac{R_e}{r_w} = \left[ \frac{1.1}{\ln(H/r_w)} + \frac{C}{L/r_w} \right]^{-1}, \text{ where} \quad (6)$$

A, B, and C = dimensionless values as a function of  $L/r_w$ ;

$R_e$  = Effective radial distance over which  $y$  is dissipated;

$r_w$  = Radial distance to the undisturbed portion of the aquifer from the center line of the well;

H = length of water column in the well;

b = hydrologic unit thickness; and

L = length of screened interval.

Because  $y$  and  $t$  are the only variables in Equation (4), a plot of  $\ln y$  versus  $t$  semilogarithmic paper may be used to determine  $[\ln(y_o/y_i)]/t$ . The straight line through the data points can also be used to select two values of  $y$ , namely  $y_o$  and  $y_i$ , along the time interval  $t$  for substitution into Equation (4). Because drawdown of the groundwater table around the well increases exponentially and time increases linearly as the test progresses, the points begin to deviate from the straight line for large  $t$  and small  $y$ . Thus, only the linear portion of the curve should be used to evaluate  $[\ln(y_o/y_i)]/t$  for the calculation of  $K$  using Equation (4) (Bouwer, 1989).

#### E.4 SLUG TEST RESULTS

The graphs illustrating the plotted displacement values versus time are presented in this section. The computed hydraulic conductivity values for the monitor wells at IRP Sites No. 25 and No. 26 are presented in Table E.1.

**Table E.1**  
**Slug Test Results, IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Monitor Well	Hydraulic Conductivity (ft/min)	Hydraulic Conductivity (gpd/ft <sup>2</sup> )
<b>IRP Site No. 25</b>		
025-001MW	$9.946 \times 10^{-4}$	10.9
025-002MW	$8.604 \times 10^{-4}$	9.26
025-003MW	$3.043 \times 10^{-4}$	3.28
<b>IRP Site No. 26</b>		
026-001MW	$9.481 \times 10^{-3}$	102
026-002MW	$2.926 \times 10^{-2}$	315
026-003MW	$1.442 \times 10^{-3}$	15.5

ft/min – feet per minute.

gpd/ft<sup>2</sup> – gallons per day per square foot.

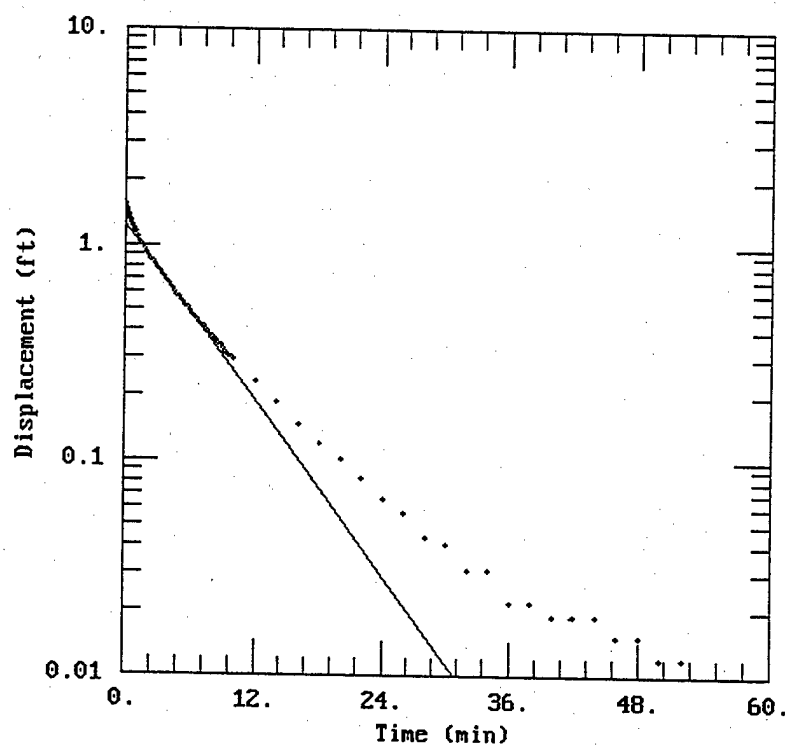
CLIENT: HQ ANG/CEVR

COMPANY: OpTech

LOCATION: Duluth ANGB - Site 25

PROJECT: 1315-197

025-001MW



DATA SET:  
25-001MW.DAT  
08/17/95

AQUIFER MODEL:  
Unconfined

SOLUTION METHOD:  
Bouwer-Rice

TEST DATA:  
 $H_0 = 1.531$  ft  
 $r_c = 0.0833$  ft  
 $r_w = 0.375$  ft  
 $L = 10.$  ft  
 $b = 17.$  ft  
 $H = 16.76$  ft

PARAMETER ESTIMATES:  
 $K = 0.0009946$  ft/min  
 $y_0 = 1.246$  ft

AQTESOLV

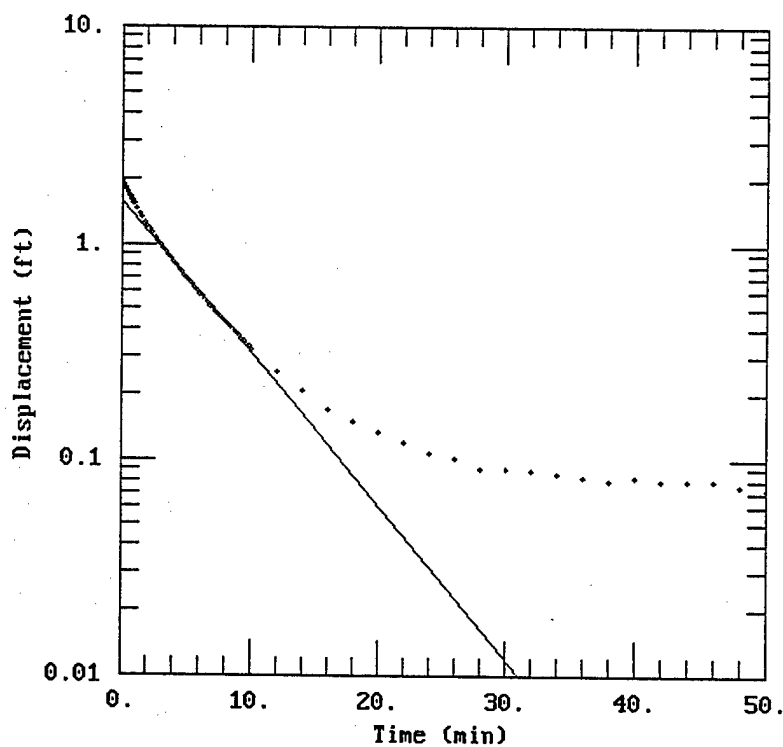
CLIENT: HQ ANG/CEUR

COMPANY: OpTech

LOCATION: Duluth ANGB - Site 25

PROJECT: 1315-197

025-002MW



DATA SET:  
25-002MW.DAT  
08/17/95

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

TEST DATA:  
 $H_0 = 1.986$  ft  
 $r_c = 0.083$  ft  
 $r_w = 0.375$  ft  
 $L = 10.$  ft  
 $b = 12.$  ft  
 $H = 10.1$  ft

PARAMETER ESTIMATES:  
 $K = 0.0008604$  ft/min  
 $y_0 = 1.559$  ft

AQTESOL



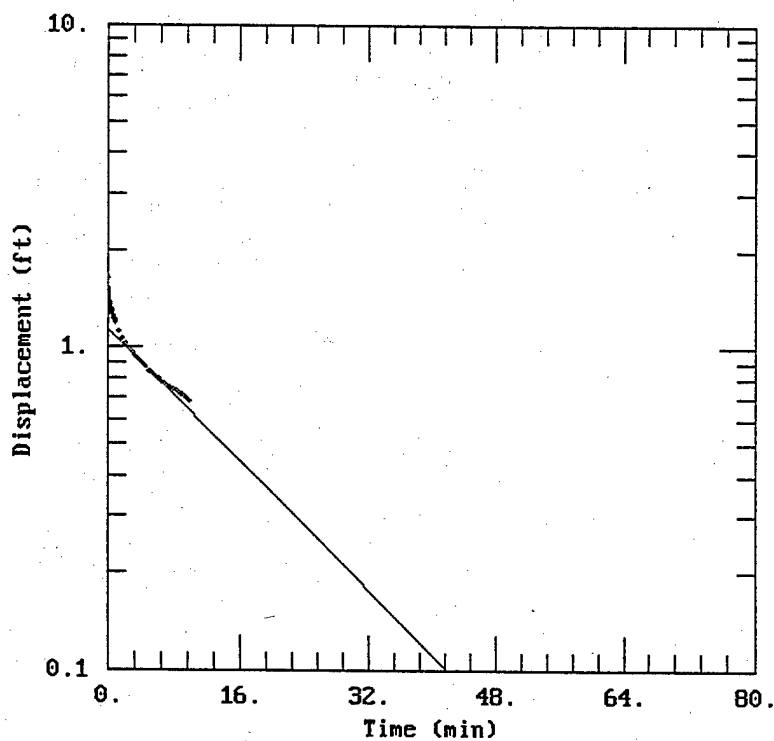
CLIENT: HQ ANG/CEVR

COMPANY: OpTech

LOCATION: Duluth ANGB - Site 25

PROJECT: 1315-197

025-003MW



DATA SET:  
25-003MW.DAT  
08/17/95

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

TEST DATA:  
 $H_0 = 1.627$  ft  
 $r_c = 0.083$  ft  
 $r_w = 0.375$  ft  
 $L = 10.$  ft  
 $b = 15.$  ft  
 $H = 11.1$  ft

PARAMETER ESTIMATES:  
 $K = 0.0003043$  ft/min  
 $y_0 = 1.126$  ft

AQTESOLV

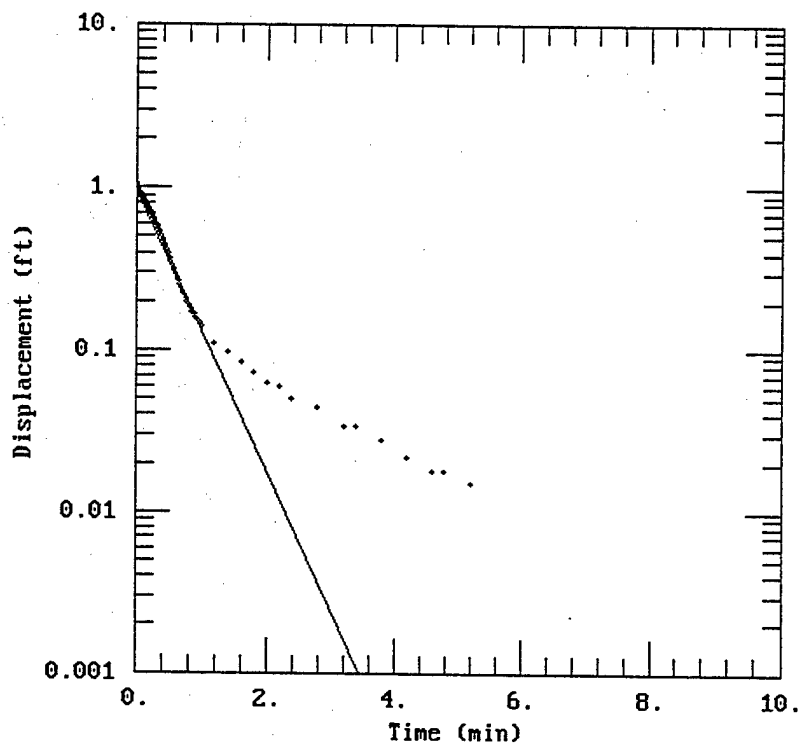
CLIENT: HQ ANG/CEUR

COMPANY: OpTech

LOCATION: Duluth ANGB - Site 26

PROJECT: 1315-197

026-001MW



DATA SET:  
26-001MW.DAT  
08/17/95

AQUIFER MODEL:  
Unconfined

SOLUTION METHOD:  
Bouwer-Rice

TEST DATA:  
H0 = 1.05 ft  
 $r_c$  = 0.083 ft  
 $r_w$  = 0.375 ft  
L = 10. ft  
b = 18. ft  
H = 8.25 ft

PARAMETER ESTIMATES:  
K = 0.009481 ft/min  
y0 = 0.9395 ft

AQTESOL

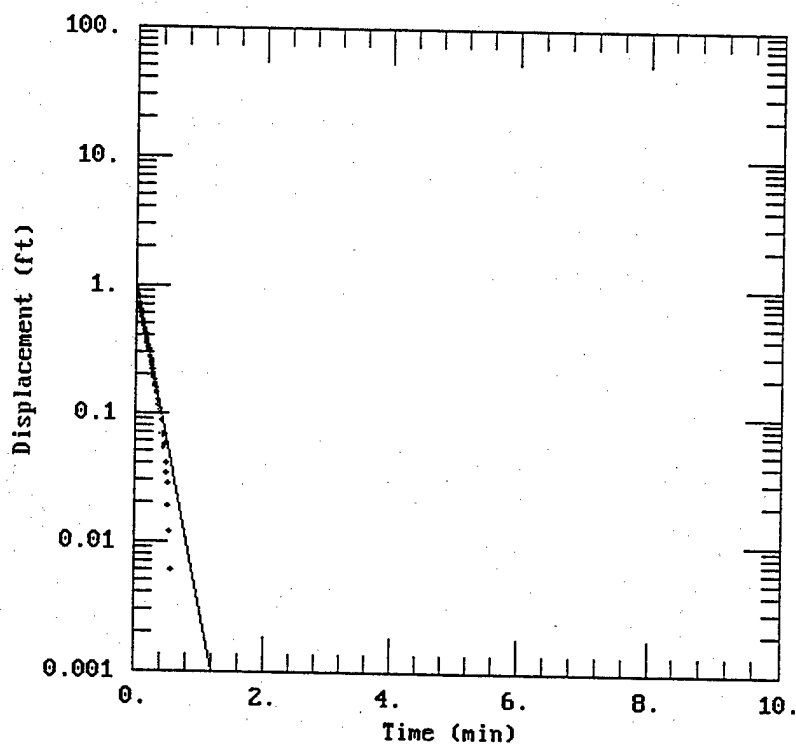
CLIENT: HQ ANG/CEVR

COMPANY: OpTech

LOCATION: Duluth ANGB - Site 26

PROJECT: 1315-197

026-002MW



DATA SET:  
26-002MW.DAT  
08/18/95

AQUIFER MODEL:  
Unconfined

SOLUTION METHOD:  
Bouwer-Rice

TEST DATA:  
 $H_0 = 0.998$  ft  
 $r_c = 0.083$  ft  
 $r_w = 0.375$  ft  
 $L = 10.$  ft  
 $b = 29.$  ft  
 $H = 11.9$  ft

PARAMETER ESTIMATES:  
 $K = 0.02926$  ft/min  
 $y_0 = 1.006$  ft

AQTESOLU

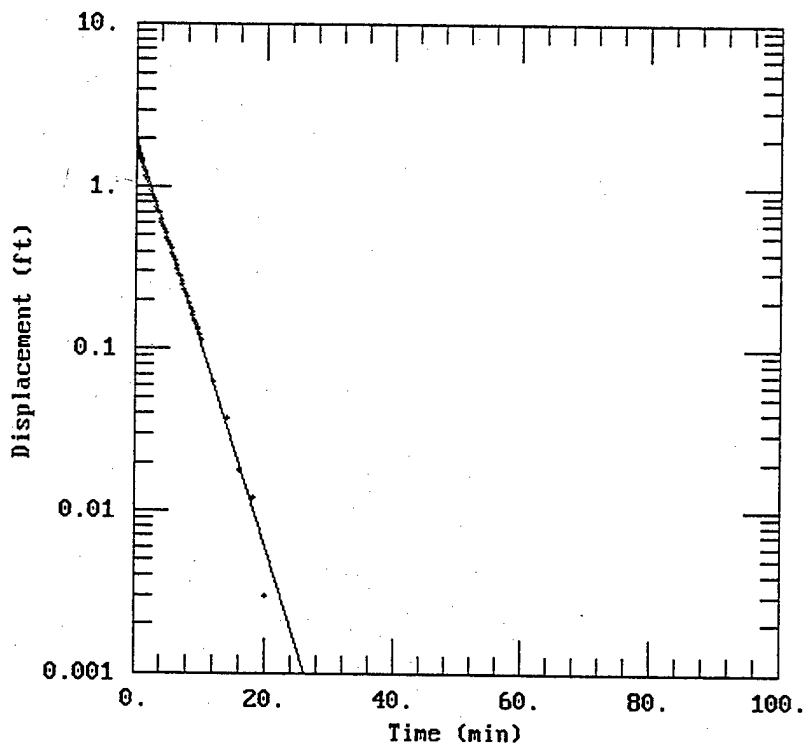
CLIENT: HQ ANG/CEUR

COMPANY: OpTech

LOCATION: Duluth ANGB - Site 26

PROJECT: 1315-197

026-003MW



DATA SET:  
26-003MW.DAT  
08/17/95

AQUIFER MODEL:  
Unconfined  
SOLUTION METHOD:  
Bouwer-Rice

TEST DATA:  
 $H_0 = 1.947$  ft  
 $r_c = 0.083$  ft  
 $r_w = 0.375$  ft  
 $L = 10.$  ft  
 $b = 29.$  ft  
 $H = 10.6$  ft

PARAMETER ESTIMATES:  
 $K = 0.001442$  ft/min  
 $y_0 = 1.902$  ft

AQTESOLV

**APPENDIX F**

**FIELD LOG BOOK DATA**

## **INTRODUCTION**

Field logbooks were maintained by Operational Technologies Corporation (OpTech) personnel for documentation of the field activities for the Site Investigation at Duluth Air National Guard Base, Duluth, Minnesota. The field work was conducted between 1 May 1995 and 20 May 1995.

**THIS PAGE INTENTIONALLY LEFT BLANK**

Kathryn Peitche-H

Duluth 57  
1315-197

RECEIVED BY THE POST OFFICE

ALBANY

1977



Monday 4/11/95

(1)

- 1245 Arrived at Duluth  
via Northwest  
Airlines - Kathryn  
Patterson  
Kathleen Moore  
Arrived at Duluth A.C.B.  
Headquarters to return  
Keys on May 247.  
For Capt. Steve Galtier  
he was going to leave the  
Keys on his desk - he  
will be flying on Monday  
/ May 1445. Keys were  
not his desk.  
Arrived at Base Live  
Engineer Bldg to meet  
Bruce Berg. He informed  
me that all utilities that  
required outside assistance  
have been cleared, all  
Base utilities will be  
cleared tomorrow. Site is  
will be started tomorrow  
as to security clearance  
4/11/95

Kathryn Patterson

(2)

5/1/95

1430

Arrived at Base Security.  
Talked to Capt. Korach  
about schedule at site  
26.

1440

Joe Byrd, Jr. and  
Destiny Greenway  
arrived at Duluth  
ANGB.

1445 -

1450

Staked soil boring  
and monitor well locations  
- KD

1620

1630

Left Duluth ANGB.

(3)

Tuesday 5/2/95

715

Depart hotel

730

Breakfast and  
morning meeting

830

Arrived at Duluth ANGB  
Kathleen Marino

Joe Byrd, Jr.

Destiny Greenway  
Kathryn Pinckett

640

Stopped by Base Civil  
Engineer - Bruce King

850

in a meeting until 1015.  
Arrived at headquarters  
to meet Capt. Stene  
Wednesday to obtain  
key for Bldg. 247  
Phone called. His

Optech office to acquire  
airbill # for box  
sent out Friday from  
office. The box

(logs + photos, etc.)  
did not arrive at  
the hotel.

Box did not leave the  
office until ~ noon  
yesterday.

Kathryn Pinckett

(4)

5/2/95

Airbill # 5344094/03

• Call FedEx - should  
arrive at 900 today

7/0

• Staked Site 21

021-026 BH

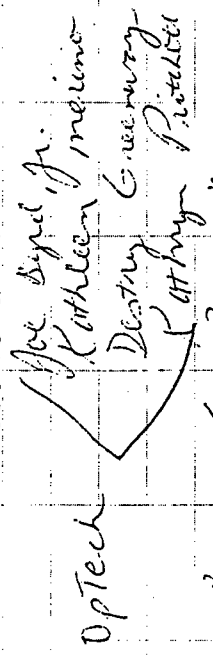
021-027 BH

021-028 BH

• marked stakes for  
sites 26 & 17

10/0

Arrived at Site 26

Optech   
Joe Sydnor, Jr.  
Kathleen Marino  
Destiny Greenway  
Kathryn Pizzolatti

Base

• Bruce Berg  
• Finished staking - off site 26  
• Put up supplies

11/0

1135

Lunch

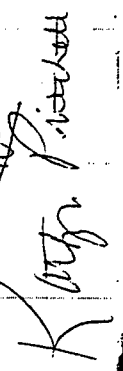
Returned to Duluth

1230

ANGS

Called American Engineering  
Testing (Dillers)

Left message

  
Kathryn Pizzolatti

5/2/95 (5)

Called Beth Curry  
(MPLA) to discuss  
the following:

• the criteria for TPH  
for sites 17 & 21  
is 100 ppm

• she will check  
with Luke (GA/QC)  
about the Wisconsin  
CRO/DRO method  
for TPH

1300 -

1330

1330 -

1430

1430

walked over sites 27 &  
21 with Bruce Berg  
called ~~Mark Escobar~~

Mark Escobar (Optech)  
to confirm that the  
contact for the geotechnical  
lab is in place at the

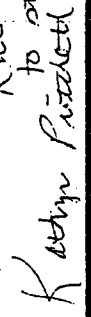
contact person is Joe  
Palo (216) 741-4290

1445

Called Dillers to  
confirm meeting at  
the Base by 7:30.

1525

Kathleen Marino &  
Kathryn arrived at Site 17  
to take backhoe location

  
Kathryn Pizzolatti

(6)

5/2/95

1625 Left Site 17  
1640 Arrived at Duluth

1700 Left Duluth ANGB.

Wednesday 5/3/95

(7)

645 Arrived at Duluth  
ANGB

Kathleen Marine  
Destiny Greenway  
Joe Sydnor Jr.  
Kathryn Pittman

Weather: Cloudy, Temp: low  
40s - 50s  
700

Check with Bruce  
Berg (Base Civil  
Engineer) about

Clearance for Site 26

→ all clear except  
26 - 001m needs to

be moved <sup>due to utility</sup>

Called ~~the~~ <sup>the</sup> ~~the~~ <sup>the</sup> Authority

talked to Rudy Winters;

inform them of our presence?

project at Site 26 - we

should be drilling at Site

26 from 3 May - 5 May

1995.

719

Calibrated FID's:

Determinator

48961-222

48962-222

X Kathryn Pittman

X Kathryn Pittman

(6)

5/3/95

Acetylene 100 ppm  
Lot # 408302 - 412503 - 46

Environmental Instruments Co.  
Explosimeter - Industrial  
Scientific MX251

910/059-002

American Engineering Testing

800

Jamie Turner  
Gary Mantary  
Jonathan Gabriel

Arrived on site  
Dullers setting up  
to decontaminate  
dull rig and augers  
on side south of  
blby 246

Kathleen & Kathleen

meins will document  
decontamination procedures  
of drill rig and augers  
Arrived at Headquarters  
to talk to Capt.  
Wabinsky about drums.

The 21 drums that were  
available are being used.  
~ 12 drums are in field  
new bldg 247

Kathy Pritchard

5/3/95 (7)

Dullers finished  
decontaminating drill  
rig and augers.

Blanch

Arrived at Site 2 Co  
Health & Safety

Meeting

Jamie Turner  
Gary Mantary  
Jonathan Gabriel  
Kathleen Meins

Darryl Greenway

De. Byrd Jr.  
Kathryn Pritchard

Started 026 - 006.BH1

Collected 0.5 - 2.5'

Encountered boulder

at 3.5' BLS - moved 1.5' south

0 LEL 70.2 % O<sub>2</sub>

0 ppm

20.9 % O<sub>2</sub>

1252 Boulder

BC PID →

0 ppm

Collected 5-7' Antenna

0 ppm

Kathy Pritchard

955

1045 -

1125

1200

1215 -

1225

1240

1250

1255

900-  
950

(10)

5/3/95

Borehole

LEL 0 LEL  
20.8% O<sub>2</sub>

0 ppm

Poor Recovery on 8-10'  
Collected 10-12' Antennal  
0 LEL 20.8% O<sub>2</sub>

1319

0 ppm

Photo Kathleen Morris  
collecting a soil  
sample at 11.5-  
12' Antennal

1326

Moving Drill  
to 026-005BH

1342

Started 026-005BH

1344

Collected 0.5-2.5'  
0 LEL 20.8% O<sub>2</sub>

Borehole

0 ppm

Photo Collecting

0.5-2.5' Antennal  
Collected 5-7' Antennal  
0 LEL 20.8% O<sub>2</sub>

1350

0 ppm

1355

Collected 8-10' Antennal

0 ppm

Kathleen Morris

(11)

5/3/95

Moved to 026-004BH  
Started 026-004BH

1415

Collected 0.5-2.5'  
0 LEL 20.8% O<sub>2</sub>

1430

0 ppm

Collected 5-7'

1438

Collected 8-10'

1448

0 LEL 20.8% O<sub>2</sub>

0 ppm

Moved to 026-001BH

1510

Collected 0.5-2.5'

1518

0 LEL 20.8% O<sub>2</sub>

0 ppm

Collected 5-7'

1525

0 LEL 20.8% O<sub>2</sub>

0 ppm

0% Recovery on 0.5-2.5'

4 5-7'

Collected 8-10'

1530

Collected 0.5-2.5'

1538

next to 026-001BH

Collected 5-7'

1542

0 LEL 20.8% O<sub>2</sub>

0 ppm

Kathleen Morris

(12)

16/5

16/23

17/45

5/3/95

Drillene depart

Site 26

Depart

Site 26

and Depart from

Federal Express

Kathy Pittsott

Thursday 5/14/95

(13)

Weather: Cloudy, low 40's  
thunderstorms expected in  
afternoon.

645 Arrived Duluth ANG B

Joe Byrd, Jr.  
Kathleen Marino

Destry Greenway

Kathryn Pittsott

Calibrated PID

715

same procedure as  
noted on pages 7-8  
of this field logbook  
arrived at headquarters  
to discuss with Capt.

725

Walravens and Paul  
Wheeler (ANG/CEUR)

about TD of soil  
borings at Site 26.  
Work Plan states to

drill to water table or  
10 feet BLS. We drill  
to 10 feet BLS yesterday  
without encountering  
saturated soil (moist soils).

Kathy Pittsott

(14)

5/4/95

We have two soil borings remaining — we will drill ~ 15' to search for water (believe to be ~ 12' BLS) on the next soil boring. If we fail to encounter water — then we will start 026-001 MW to determine water level.

730  
800

Drillers arrived.  
Drillers at fire department to fill up 200-gallon water tank

815

Drillers decontaminating the augers. Destroying Greenway is decontaminating the procedures.

830P  
842

Called Base Security to meet us at FOD area.

848  
855

arrived at Site 26 Health & Safety meeting

Kathy Pittsford

(15)

5/4/95

OpTech / Kathleen Marine- Joe Byrd, Jr.  
Destroy Greenway  
Kathryn Pittsford  
American Engineering Testing / Jamie Turner  
Garry ~~transferred~~  
Jordan Calcutt

914

checked water in boreholes

no water

026-006 BH

026-005 BH

026-004 BH

6.80' BLS 026-001 BH

920

Drillers spotted at

026-002 BH

922

Started Drilling

930 Collected 0.5-2.5'

5% Recovery

935

Collected 5-7'

0 LEL 20.5% O<sub>2</sub>

0 ppm

w.c. 6.70' BLS

Only 50% Recovery

Kathy Pittsford



(16)

5/4/95

We will re-collect  
0.5-2.5' and  
4-6' interval due  
to poor recovery.  
Collected 0.5-2.5'

950

poor recovery  
Collected 4-6',  
35%

955

O L E L 20.8% O<sub>2</sub>

0 ppm

Collected 0.5-2.5'  
O L E L 20.8% O<sub>2</sub>

1005

0 ppm

called Russ Cason  
(OpTech) about the  
drillers using  
Diamond Drilling to  
cut pad from asphalt

- 026 1001mL

Russ will check with  
Norme & John Morice,  
Drillers moved to

1055

026 - 003 ~~ppm~~ BH  
Started drilling  
5/11/95

Kathy Pastorek

(17)

5/4/95

Collected 0.5-2.5'

0 ppm

O L E L 20.8% O<sub>2</sub>

Collected 5-7'

0 ppm

O L E L 20.8% O<sub>2</sub>

For Russ Cason, John Morice,  
& Norme Cough - the  
drillers can have Diamond

Drill for cutting pad area  
for 026 - as shown as long  
as there is proof of

insurance.

stopped Drilling

left Site 26

left Duluth SPANGB

lunch

arrived at Duluth ANGOS

contacted Base Security

for escort to Site 26

Arrived at Site 26

Destroy Greenway

Kathleen Morice

Kat Loya PR Tech

Kathy Pastorek

(18)

5/4/95

Diamond Drill had arrived at 1215 and stayed on Site 26 until 1245.

Drillers were starting to grout boreholes with 97% Neat Cement 3% Bentonite Powder mixed with potable water a 7 gallons per 100 lb mixture.

1450 Depart Site 26

1435 Re-Collected 0.5 - 2.5 at 026-003BH

Drillers decontaminating drill rig & augers

Collected equipment

rinseate blank

(split-spoon samples)

VOC (0246) (3) 40-ml VOA vials HCL

SVOC (0276) (1) SVOC under 1L

metals (1) 1 L poly HNO<sub>3</sub>

Cr (6010)  
Pb

Kathy Pritchett

(19)

5/4/95

1525 Arrived at Site 26

Dusty Greenway

Kathleen Marino

Kathy Pritchett

Started drilling B

026-001MJA

1535 Drillers inform

us that they need

a part for drilling

the borehole for the

monitor wells

1545 Drillers depart

Site 26

1602 Depart Site 26

1710 Arrived at FedEx

1725 Depart FedEx

HP

Kathy Pritchett

(20)

Friday

5/5/95

Weather:

cloudy, windy (NW gusty); 40' w/d; wind mil 20 to 30.

645

Arrived at Duluth NWS

Joe Byrd, Jr.

Destiny Greenway

Kathryn meino

Kathryn Patella

Calibrated PID

Serial # stated on

page 7 of this field

logbook.

Acetylene 100 ppm

Lot # 41809-42631-24

Environmental Instruments

Calibrated Industrial

Scientific Model

MX25/ # 9101059-002

Hayco 50.0% LEL

Pentane Lot 41780

Drillers arrived

Arrived at Site 26

< Igme Tuura

Jonathan Gabriel

Kathryn Patella

740

800

American

Engineering

Testing

(21)

5/5/95

Health & Safety

Meeting

Joe Byrd

Kathleen meino

Destiny Greenway

Kathryn Patella

Igme Tuura

Jonathan Gabriel

Optech

American

Engineering

Testing

820

Started drilling

626 - 001m

Collected 0-2'

0 ppm

0 LEL 20.7% O<sub>2</sub>

Borehole

0 ppm

0 LEL 20.7% O<sub>2</sub>

BG

0 ppm

Collected 5'-7'

825

0 ppm

Collected 10-12'

840

0 ppm

0 LEL 20.8% O<sub>2</sub>

Collected 12-14.5'

0 ppm 12.5-14.5'

0 LEL 20.6% O<sub>2</sub>

Kathryn Patella

920

5/5/95

900

Collected 15-17'

0 ppm

OLEL 208402

930

Collected 20-22'

0 ppm

saturated  
encountered boulder  
~ 16.5' BLS

940  
948

WL ~ 17.2 BLS  
W.C. ~ 17.2 BLS.

Decided to set  
bottom of screen at  
25' BLS TD = 26'

1005

Collected 24-26' BLS

0 ppm

Depart Site 26

Joe Byrd, Jr.

Kathy Pritchett

arrived at headquarters

to discuss schedule

arrived at Site 26

Started construction

of monitor well

026-001mw

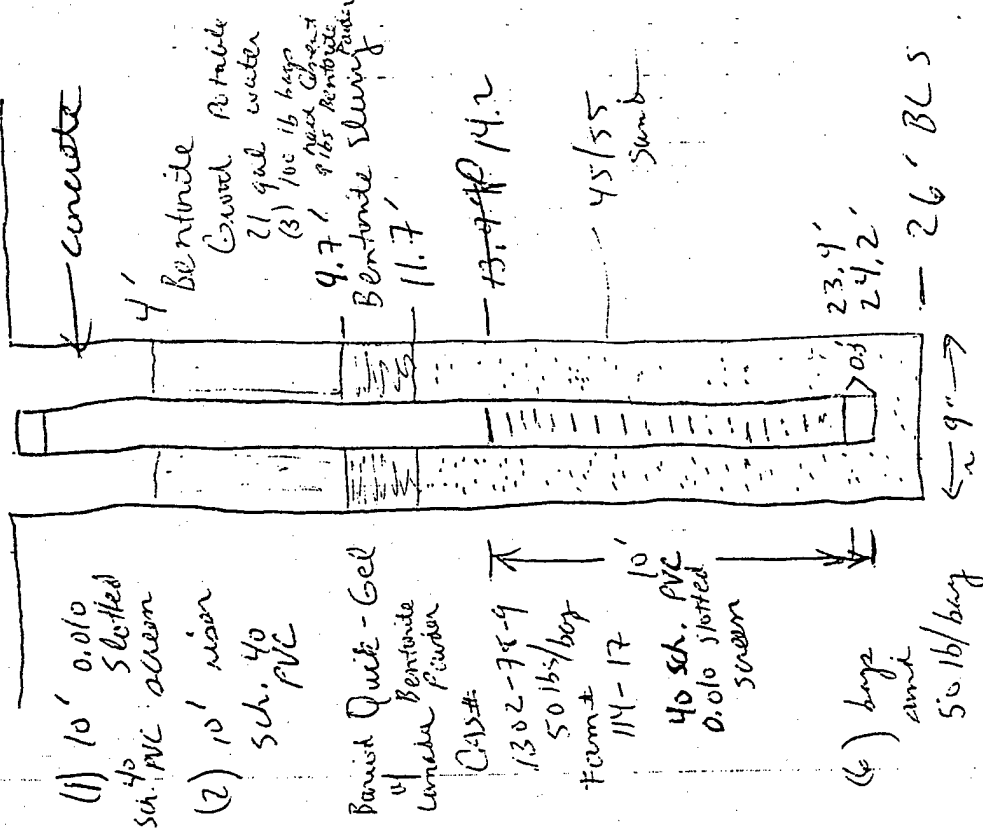
Screened interval 15'-25'

Kathy Pritchett

23

5/5/95

026-001mw



Kathy Pritchett

(24)

1215

1225

Sand at 14.5' BLS

Depart Site 26

for lunch

Deotry Greenway

Kathleen Mering

Kathryn Pittelott

Returned to Site 26

Deotry Greenway

Kathleen Mering

Kathryn Pittelott

Drillers started again

with installing filter pack.

Drillers finished

grating 026-00/mw

Depart Site 26

Drillers decontaminated

drill rig + augers

by the following procedures:

• steam clean with

Liquinox™ and potable

water; and

• rinse with potable

water

finished decontaminating

drill rig + augers

Kathryn Pittelott

1600

5/5/95

Sand at 14.5' BLS

Depart Site 26

for lunch

Deotry Greenway

Kathleen Mering

Kathryn Pittelott

Returned to Site 26

Deotry Greenway

Kathleen Mering

Kathryn Pittelott

Drillers started again

with installing filter pack.

Drillers finished

grating 026-00/mw

Depart Site 26

Drillers decontaminated

drill rig + augers

by the following procedures:

• steam clean with

Liquinox™ and potable

water; and

• rinse with potable

water

finished decontaminating

drill rig + augers

Kathryn Pittelott

5/5/95

Mobilized drill

rig on Site 26

Kathryn Pittelott

Jamie Turner

Depart Site 26

Depart Duluth ANCB

Stopped at Target to

purchase supplies

1605

1610

1615

1630

Kathryn Pittelott

(26)

Saturday 5/6/95

Weather: Sunny; 40's;  
gentle winds!

645 Arrived at Duluth ANS-B

Joe Byrd, Jr.  
Kathleen Marino

Destiny Greenway  
Kathryn Pritchett

650 Calibrated P.I.D

Same procedures as

stated on pg 20 of  
field logbook

701 Calibrated MX251

same procedures as

stated on pg 20

of field logbook

720 Arrived at Site 26

Joe Byrd, Jr.

Kathleen Marino

Destiny Greenway

Kathryn Pritchett

Drillers arrived at Site 26

Jamie Turner

Randy Wolf

American

Engineering

Testing

Kathryn Pritchett

5/6/95

(27)

Jamie pipe (PVC)  
was steam cleaned  
yesterday afternoon

815 O L E L 20.6% O<sub>2</sub>

O ppm

Started Heston Safety

Meeting

Jamie Turner

Randy Wolf

Kathleen Marino

Joe Byrd, Jr.

Destiny Greenway

Kathryn Pritchett

Started Drilling

Collected 0.3-2.5'

Poor recovery

Collected 5-7'

O ppm

Photo 026-003mw

- hammering split-spun

sample

Boresole O L E L

20.7% O<sub>2</sub>

O ppm

K-water in canister

Kathryn Pritchett

(26)

5/6/95

837 Re-Collected 0.5-2.5' Poor Recovery

840 W.L. 4.8' BLS

842 W.L. 0.26-0.01 MW 17.1' BLS Collected 10-12

852 0 ppm

900 W.L. 0.4 EL 20.7% O<sub>2</sub> 8.7' BLS

904 Re-Collected 0.5-2.5' need to recover at least 75% for geotechnical sample

910 Collected 15-17' 11.2' BLS

920 W.L. 6.3' BLS

929 W.L. 6.4' BLS

W.L. 6.3' BLS

950 5' sand in auger

TD Auger at 15' BLS

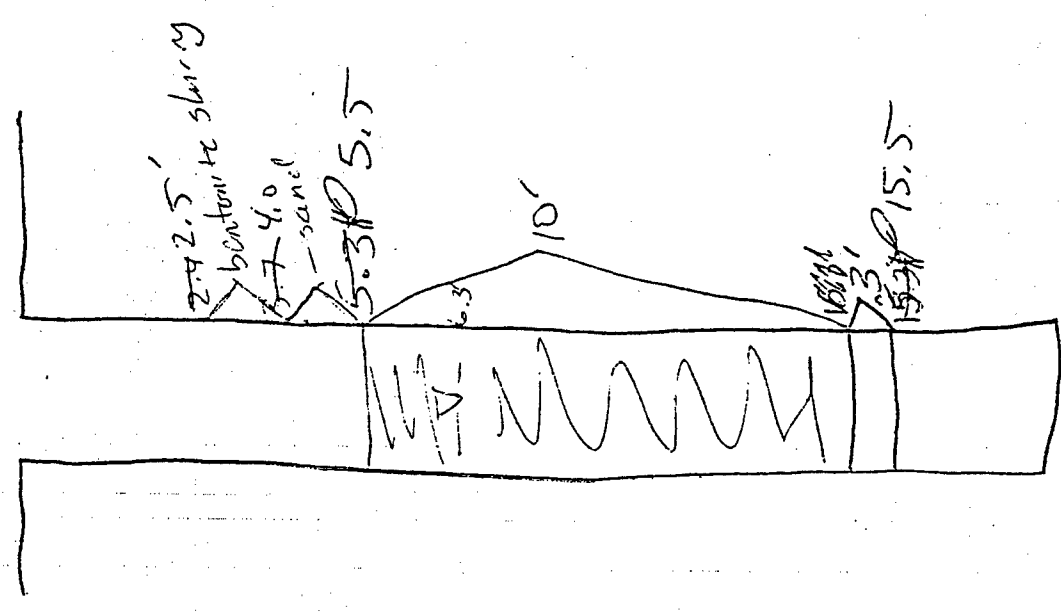
Note: Schenck PVC screen & rebar 40' were pre-cleaned at manufacturer and pre-wrapped.

Screen will be set from 5.5' - 15.5' BLS.

Kathy Pittsott

(29)

5/6/95



Kathy Pittsott

(30)

5/6/95

026-003 mwd

- (1) 10' screen
- (1) 10' riser

2.5' Bentonite Slurry

4.0' - 5.5'

Schedule 40

APC

0.010" 5/16" x 1/2" screen

(2.5) 50 lbs

bag

of sand

45/55

Ball Flint Sand

15.5'

1044

1/59

finished construction  
depart Site 26 for  
decontaminating drill rig  
& auger and tremo pipe  
Kathy Pritchett

5/6/95

(31)

by procedures stated  
on pg 24 of this field  
logbook.  
Called Northeast  
Technical about pick  
up for geotechnical samples  
— lab tech. needs to  
contact Joe Palo —  
need to call back in  
15 minutes

Northeast Technical

315 Chestnut St.

Virginia, MN 55742

Attn: Joe Palo

(218) 741-4290

(218) 741-1442

Dorothy Brian Hayden

(218) 724-3114

Drillers finished drilling  
decontaminating

arrived Site 26

1210

1225

Started 026-002 mwd

Collected 0.5-2.5'

0 ppm

0.7% O<sub>2</sub>

Kathy Pritchett



(32)

5/6/95

1238

Collected 5-7'

0 ppm

Collected 10-12'

0 ppm

1248

W.L. 10.3' BLS

Recollected 0.5-2.5

1255

W.L. 9.4' BLS

1300

W.L. 9.1' BLS

1305

Collected 15-17'

0 ppm

W.L. 14.1' BLS.

1345

W.L. 14.1' BLS

Shut down for day  
to wait for water to  
rise in borehole

026-002MW

Drillere placed head

on auger

Drillers depart Site 26

1357

Joe Byrd depart  
Site 26.

1425

Depart Site 26

Deotry Greenway

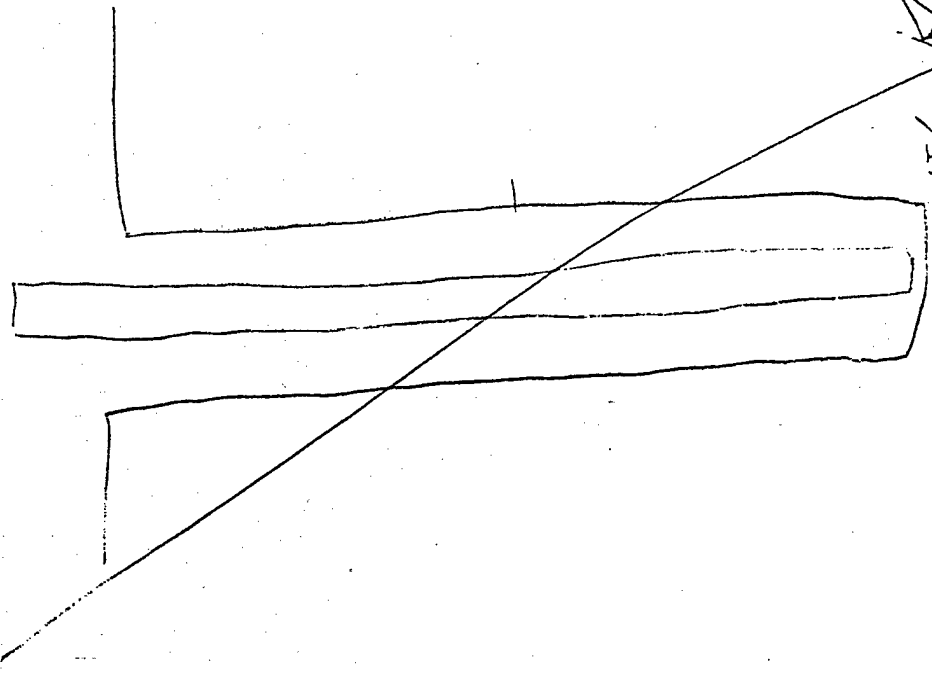
Kathleen Menno

Kathryn Pittsford

Kathryn Pittsford

5/6/95

(33)



Note: Samples collected for geochemical  
Parameters are from 026-003MW-15-17  
and 026-002MW-0.5-2.5

1450 Depart Duluth ANGLS

Joe Byrd, Jr. remain to finish  
Greenway samples.

Kathryn Pittsford

(84)

Monday 5/8/95

Weather: Cloudy; 40's /  
gentle wind / NE  
Arrived Duluth ANGB

650 Doty Greenway  
Kathleen Norwood

Joe Byrd, Jr.  
Kathryn Pizzolotti

Joe Byrd, Jr. is  
calibrating  
4 MX251  
PIDs - Norwood

700

The batteries in the PIDs  
were down low - left  
pin in (but it was  
in sleep mode).  
Arrived Site 26  
Kathleen Norwood  
Kathryn Pizzolotti  
Duluth arrived

740

Jonnie Turner  
Jonathan Gabriel  
Health & Safety Meeting  
Jonnie Turner  
Jonathan Gabriel  
Kathleen Norwood  
Kathryn Pizzolotti

747

750

Kathy Pizzolotti

5/8/95 (35)

755 026- W.L. 13.4'  
002mw collected 20.22'  
825 0 LEL 20.8% O<sub>2</sub>  
BGL Bachelle W.L. 11.3' BLS  
830 →  
840 W.L. 11.3' BLS  
850 Started construction of  
026-002mw  
Screen interval 9-19'  
TD 20' BLS

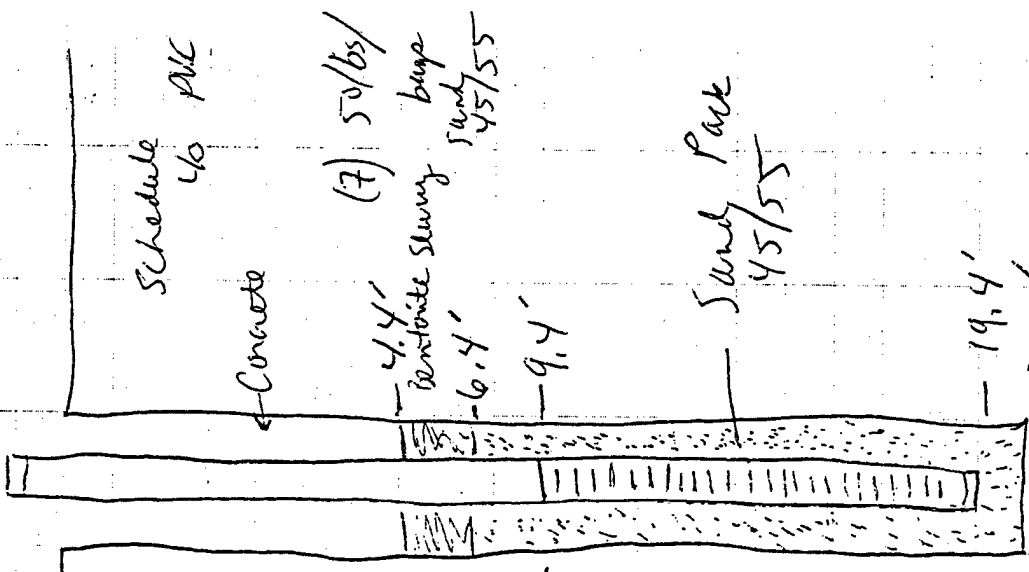
Kathryn Pizzolotti

(36)

5/8/95

026-002 MW

- (1) 10' 0.01 slot screen
- (2) 10' man



11/30

Finished Construction  
Kathy Pirtwell

(37)

5/8/95

Depart Site 26  
lunch

11/35  
1200--  
1300

Called for Site about shipment of Hermit for 17 May delivery. Jeff Davis is set to lunch - talked to Steve Amine Order # 0495225 - Called office to obtain Mastercard # for Hermit (for Site) does not take American Express

1-800-  
446-  
7488

1301

Matt Alexander - not in office or John Davis  
Called Beth Garry about Wisconsin BLO/DLO for TPH -> OKay with MCA

1305

1315 Per Russ  
Lison  
BankOne Mastercard  
5347-1116-0006-6694  
Earl E. Parker II 6/196

Kathy Pirtwell

(38)

5/8/95

1345

Arrived at Site 26

Kathleen Menno  
Kathryn Pittsott

Drillers are finishing  
surface completion.

Rain - steady, cold

1505

Depart Site 26

- concrete pads are  
complete.

- grand port will be  
installed tomorrow and  
development should start  
tomorrow if weather  
permits.

1530

depart Duluth ANGB

Kathryn Pittsott

(39)

Tuesday 5/9/95

Weather: Windy, low 40's,  
rain

645

Arrived at Duluth  
ANGB

Joe Byrd, Jr.

Destiny Greenway  
Kathleen Menno

Kathryn Pittsott

Left Duluth ANGB

800

Returned Ford Explorer  
to exchange for another  
(Budget request)

819

Dillers arrived at  
Duluth ANGB

824

Dillers decontaminated  
all-terrain drill rig

as per procedures  
stated on page 24 of  
this field logbook.  
The all-terrain drill  
rig will be used for Sites  
25, 21 & 17.

930

finished decontaminated &  
reporting

Kathryn Pittsott

(40)

935

5/9/95

Started decontaminating  
drill rig (truck + mounted)  
before departing Duluth  
ANGB as per procedures  
stated on page 24 of this  
field logbook.

1005

1015

Finished decontaminating  
Called Tim Buck  
with Twin Port Testing  
(218) 722-1911

West on Superior St.

Turn Gayfield ~ 1/4 mile  
on left by bridge

Wednesday 5/10/95

(41)

Weather: Cloudy; low 40's  
Calm wind; 45% chance of  
rain

645 Arrived at Duluth ANGB

Joe Byrd

Dorothy Cheeney

Kathleen Mervin

Kathryn Pissett

650 • Calibrating (Joe Byrd, Jr.)

PIDs as per procedures

stated on pg 20 of this

field logbook

• new types of calibration

gas arrived yesterday

for PIDs.

Calibrated MX251

700

as per procedures stated

on page 20 of this field

logbook.

11.68' B70C

021-009MW

Phillips arrived at

Duluth ANGB

R

Kathryn Pissett

W.L.

HP740

Kathryn Pissett

(42)

810

Health + Safety  
Meeting - Site 25  
Janice Turner  
Jonathan Gabriel  
Destiny Greenway  
Kathleen Marino  
Joe Byrd, Jr.  
Kathryn Pittsford

822

Started Drilling  
0.25 - 0.01 mm

825

Collected 0.5 - 2.5'

0 ppm

0 LEL 20.5% O<sub>2</sub>

830

Collected 5-7'

0 ppm

Collected 10-12'

0 ppm

Borehole 0 ppm

Drillers stopped to  
retrieve shovel at  
Site 26

915

Continued drilling  
Fuel from 0-11' BLS

920

Collected 15-17'

Kathryn Pittsford

(43)

5/10/95

925

Gary Wint  
American Engineering Testing  
arrived at Site 25

930

Gary Wint  
Joe Byrd, Jr.  
to Site 26 to develop  
monitor wells at Site 26

932

Collected 15-17'

937

0 ppm  
0 LEL 20.6% O<sub>2</sub>

Borehole

~ 937

Collected 20-22'

944

0 ppm  
collected 25-27'

0 ppm

0 LEL 20.6% O<sub>2</sub>

23.5

W.L. 23.8' BLS

2.5

Sand & Gravel lens

31.5

~ 22.5 - 25'

21.0

W.L. 23.6' BLS

21.0

Driller (pinned) ~ 23.5' BLS

1000

W.L. 23.5' BLS

1023

W.L. 23.2' BLS

4 1010

Kathryn Pittsford

(49)

5/10/95

1040

collected 30-32

0 ppm

0.2 EL 20.6% O<sub>2</sub>

1055

W.L. no water

lens sealed off  
with augers

instructed drillers to  
collect 35-37'

could have encountered  
perched conditions

1104

Collected 35-37'

0 ppm

0.2 EL 20.6% O<sub>2</sub>

1112

W.L. 32.4' BLS.

advancing augers  
to 46' BLS then  
allow to set for  
water level to rise

in borehole

~39.8' BLS

auger refusal

W.L. 34.9' BLS.

1130

lunch

Return to Douth Ave

1230

Kathy Pritchett

(45)

5/10/95

1231

W.L. 34.7' BLS.

39.8

34.7

5.1

Screen Interval; 29-39' BLS

1235 started construction

of 0.25-0.1 mu

1530 finished construction

1531 Drillers decontaminating

drill rig, augers,

& theme pipe as per

procedures stated on

page 24 of this

field logbook

finish decontaminating

Moved to 0.25-0.02 mu

Collected 0.5-2.5'

1600

0 ppm

0.2 EL 20.6% O<sub>2</sub>

1620

Collected 5-7' BLS

0 ppm

1630

Collected 10-12'

0 ppm

Kathy Pritchett

(46)

5/10/95

SP 025-001 MW

fluid  
mount  
surface completion

Bentonite

Cement

3% Bentonite

powder

97% bent

element

mixed with

potable

water

(27 gals  
per 100 lb  
of cement)

22.5

Bentonite slurry

27' BLS

-29.4'

-39.4'

39.8' BLS

TD

(1) 10'  
D.O.I.O  
Green  
PVC  
Schedule  
40

(3) 10'  
riser  
PVC  
Schedule  
40

(6) 50 lb/bag  
Sand  
45/55

Kathy Pizzichelli

(47)

5/10/95

Borehole O L E L 20.6602

0 ppm

Advancing sensors to 15' BLS

Collected 15-17'

0 ppm

W.L. 14.3' BLS

allowing water to rise

Dialers depart Site

25' & Duluth ANG-8.

Escorted to near

Bldg. 500 to check

on the Synd. fr. and

Cary Winty on

development

026-001 MW

026-002 MW

Depart Site 26

Depart Duluth

ANGB

1750

1800

Kathy Pizzichelli



Thursday 5/11/95

(48)

Weather: Sunny ~45°F high  
60's; light NW winds

645 Arrived at Duluth ANGB

for Byrd, Jr.

Dusty Greenway  
Kathleen Marino

Kathy Pritchett

Calibrated PID

as per procedures stated

on page 20 of this  
field logbook.

Calibrated MX251

as per procedure stated  
on page 20 of this field  
logbook

Dillers arrived

Jamie Tuura

Jonathan Gabriel

Health & Safety

Meeting

Jamie Tuura

Jonathan Gabriel

Kathleen Marino

Kathy Pritchett

Dusty Greenway

for Byrd, Jr.

Kathleen Marino

5/11/95

(49)

025-002mw W.L. 60.0' BLS

021-012PM 7.11' BTDC

stick up ~ 2.1"

~ 40' North of 025-002mw

TD 16.9' BTDC

021-012PM

025-002mw Seven interval

5-15'

TD 7.16'

815 decontamination

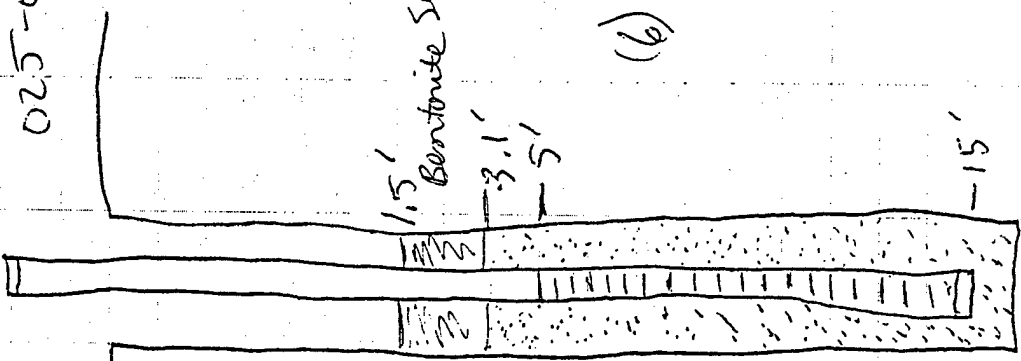
Kathy Pritchett

(50)

5/11/95

025-002mw

- (1) 10' Screen
- (1) 10' riser
- Schedule 40
- PVC



(6) 5016

TD 16'  
1039 finished construction  
Kathryn Pizzol

(51)

5/11/95

Surface completion

1100-1200

drilled at site 17 to

walk over site

drilled at Dutch AVIGS.

Drillers decontaminating

drill rig, augers, & tool

pipe as per procedure

stated on page 24 of this

field logbook.

finished decontaminating

decontaminating

at 025-003mw

BC OLEL 20.5% O<sub>2</sub>

0 ppm

moved 025-003mw

due to Soft Ground

→ approved new location

by Bruce Day

SPD Collected 0.5-2.5

0 ppm

Collected 5' +'

OLEL 20.6% O<sub>2</sub>

5/11/95

1420 Borehole Collected 10-12' BLS

0 ppm  
0 LEL 20.5% O<sub>2</sub>  
0.8 ppm split again  
Collected 15-17'

15 ppm  
Peat unit - show  
Collected 20-22' ppm

Borehole 3.2 ppm  
0 LEL 20.5% O<sub>2</sub>  
1440 W.L. 12.7' BLS

12.5 20.0  
8 12.5  
20.5 7.5

Screen 10-20' BLS  
drilled TD 21' BLS  
Borehole 4.7 ppm  
0 LEL 20.5% O<sub>2</sub>  
Informed drillers of  
borehole PID & LEL

slight fuel odor 40 ppm  
Breathing zone 0 ppm  
PID flameless  
Pipe  
Kathy Pittcock

5/11/95

Collected 10-12' BLS  
0 ppm  
0 LEL 20.5% O<sub>2</sub>  
0.8 ppm split again  
Collected 15-17'

15 ppm  
Peat unit - show  
Collected 20-22' ppm

Borehole 3.2 ppm  
0 LEL 20.5% O<sub>2</sub>  
1440 W.L. 12.7' BLS

12.5 20.0  
8 12.5  
20.5 7.5

Screen 10-20' BLS  
drilled TD 21' BLS  
Borehole 4.7 ppm  
0 LEL 20.5% O<sub>2</sub>  
Informed drillers of  
borehole PID & LEL

slight fuel odor 40 ppm  
Breathing zone 0 ppm  
PID flameless  
Pipe  
Kathy Pittcock

5/11/95

025-003 MW  
(1) 10' Screen  
0.01  
(1) 10' riser  
Schedule  
40  
PVC

5.75 50 lb/bag  
Sand  
45/55  
4.0' BLS  
Bentonite Slurry  
7.6' BLS  
- 9.7' BLS

19.7'  
TD 21' BLS  
finished construction  
Drillers departed  
ANG  
Kathy Pittcock

1615  
1625

(54)

Boehle PID  
1700 Depart

5/11/95

0.3 ppm  
Duluth ANGOS

(55)

5/12/95

Weather: Sunny, 60's - high 70's.  
slight wind (from the west)  
Arrived at Duluth ANGOS  
647

Joe Sydnor, Jr.

Kathleen Merino

Destiny Greenway

Kathy Pittsett

To develop  
monitor wells  
655

Craig Witty

Calibrated PID on

per procedures stated

on page 20 of this

field logbook.

710  
Call of Calibrated MX251

as per procedures stated

on page 20 of this

field logbook.

730 718  
Drillers arrived

Jamie Taura

Jonathan Gabriel

735

Health & Safety meeting

Jamie Taura

Jonathan Gabriel

Kathleen Merino

Destiny Greenway

Kathy Pittsett

Kathy Pittsett

57

5/17/95

Drillers are enlarging  
guard post holes at  
025-0031W

Drillers are decontaminating  
drill rig and  
per procedures. started on  
page 24 of this field  
logbook

finished decontaminating  
moved to 025-008BH

Started drilling  
Collected 0.5-2.5'

0 ppm  
Collected 5-7'  
~~0 ppm~~ 0% Recovery

BG

0 LEL 20.6% O<sub>2</sub>  
Collected 7-9'

2.0 ppm

poor recovery 10%  
collected screening  
Collected 9-11'

0.5 ppm

0 ppm OLEL  
Kathy Pinterova

935

1000

1005

1015

1025

1030

1035

Borehole

5/17/95 (57)

1100 Collected 13-15' BLS

0 ppm

1130 moved to 025-001154

Returned from lunch

1230 Collected 0.5-2.5'

0 ppm

Borehole 0 LEL 20.6% O<sub>2</sub>

1300 Collected 5-7' BLS

0 ppm

1305 moved to 025-0080BH

1323 Collected 0.5-2.5'

0 ppm

Borehole 0 LEL 20.5% O<sub>2</sub>

1332 Collected 5-7'

0 ppm

Borehole 0 LEL 20.6% O<sub>2</sub>

1340 Recollected 0.5-2.5' BLS

0 ppm

1400 moved to 025-00904

1350 Richard Saxton (miner)

arrived at Site 26

1415 Collected 0.5-2.5'

Borehole

0 ppm OLEL 20.5% O<sub>2</sub>

Kathy Pinterova

58

5/24/95

1423

Collected 5-7' BLS

0 ppm

1432

Collected 10-12' BLS

0 ppm

Barbado 0 ppm 0 LEL 2000

Duplicate collected

10-12' BLS

(11-12 - sample) (10-11 dup)

1439

Collected 13-15'

0 ppm

Moved to 025-0063H

1515

Collected 0.5-2.5'

0 ppm

1518

Collected 5-7'

0 ppm

0 LEL 20.6% O<sub>2</sub>

1523

Collected 10-12'

0 ppm

1535

Collected 18-20'

0 ppm

0% Recovery

1544

Collected 20-22'

0.7 ppm

Dullens grant soil borings

Kathy Pinnett

5/24/95

59

1625

Collected equipment

Minerals 025-001R2

UOL (8240)

(3)

800 (8270)

(1)

Pb (7421)

(X)

Ld (6010)

Cr (7146)

Ni (6010)

Hg (7470)

1630

Dullens depart Dullens

ANGB

1730

Report Dullens ANGB

for Federal Express

Joe Synd, Jr and

Gary Witty are developing

the West monitor well

0 25-003mm

+600 1750

Report Federal Express

KL

Kathy Pinnett

(60)

Monday 5/15/95

Weather ☀️

Sunny high 60° -  
winds - from NW west, gentle  
64° arrived at Duluth ANGB

Joe Byrne, Jr.  
Theodore Greenway  
Kathleen Weir  
Kathy Pintola

Calibrated PID & MK25

62 per procedures  
stated on page 20 of  
this field logbook.  
Dillens arrived

Janie Taura  
Jonathan Gabriel

8/5 Dillens decontaminated  
Augura as per procedure  
stated on page 24 of  
field logbook.

Report of Duluth ANGB  
to clean Site 17

Arrived at Site 25  
moved to 025-003BH  
BG 20.6% O<sub>2</sub> O LEL

0 ppm  
Kathy Pintola

7/5

7/5

8/5

8/5

9/30  
9/40

BG

5/15/95

(61)

950 Collected 0.5 - 2.5

Boothole 0 ppm  
O LEL 20.6% O<sub>2</sub>

955 Collected 5-7 BL5  
0 ppm

99000 Collected 10-12 BL5  
273 ppm

Boothole 333 ppm  
LEP MK251 - low on  
Breathing zone 0 ppm

1008 Left Site 25 to buy  
batteries for MK25

1023 Boothole 0 LEL 20.5% O<sub>2</sub>

1030 Collected 15-17 BL5  
Boothole 296 ppm  
5 LEL 20.5% O<sub>2</sub>

1045 Collected 18-20  
9.5 ppm

Boothole 296 ppm  
1 LEL 20.5% O<sub>2</sub>

317 ppm  
5 LEL 20.5% O<sub>2</sub>

Kathy Pintola

(62)

5/15/95

1055 Collected 23-25'  
0% Recovery  
Boothole 205 ppm  
2 LEL 20.5% O<sub>2</sub>  
290 ppm  
6 LEL 20.5% O<sub>2</sub>  
1110 Re-Collected 25-27' 20-25'  
Water encountered ~ 22'  
hole collapsed —  
24-25' sidewall from  
that interval — brecciating  
only  
TD 25'  
lunch

1130-  
1225

1230 Moved to 015-002BH  
1245 Collected 0.5-2.5'  
0 ppm

Boothole 0 ppm  
0 LEL 20.5% O<sub>2</sub>  
Boothole 72 ppm  
avg 5' BLS 0 LEL 20.5% O<sub>2</sub>  
1250 Collected 5-7'  
541 ppm

Kathy Patchett

(63)

5/15/95

Boothole 69 ppm  
Breathing zone 0 ppm  
1305 Collected 10-12'  
330 ppm  
Boothole ~ 7.5-8.5'  
342 ppm  
1312 7 LEL 20.5% O<sub>2</sub>  
421 290 ppm  
1315 12 LEL 20.5%  
Shut down

1324 Drilling  
Called Russell Cason  
& for Williamson  
→ informed of LEL  
reading of 12 — per  
for Williams needs to be 10 LEL  
in breathing zone  
— can stop drilling if  
driller feels uncomfortable

1345 unsafe about drilling  
Informed driller of  
conversation with Optima's  
Health & Safety OHS manager  
(for Williams) — stating  
of low chance of ignition  
but equipment requires double

Kathy Patchett



(64)

5/15/95

due to low oxygen downhole  
 — driller (Greece Turner) informed  
 us that he had experienced  
 explosions downhole in the  
 past and he felt unsafe  
 with drilling deeper. He  
 recommended waiting borehole  
 before pulling augers to air  
 down on surface. I recommended  
 that ~~the drilling~~ drilling  
 should cease with soil  
 being 0.25-0.02 BH.  
 Everyone felt unsafe &  
 uneasy about advancing  
 the augers.

14/15

Drillers' decontaminating  
 drill rig at augers as  
 per procedure stated on  
 page 24 of this field  
 logbook.

finished decontaminating  
 moved to 0.25-0.01 BH  
 collected 0.5-2.5'

1520  
 1525  
 1530

0 ppm  
 Kathy Pistlett

(65)

5/15/95

Borehole 0 ppm  
 0 LEL 20.5% O<sub>2</sub>  
 1540 augers at 5' 0 ppm  
 0 LEL 20.5% O<sub>2</sub>  
 1541 collected 5-7'  
 742 ppm  
 Borehole 33 ppm  
 0 LEL 20.5% O<sub>2</sub>  
 collected 10-12'

1547 Borehole 250 ppm  
 11 LEL 20.5%

Breathing zone 20 ppm  
 1605 Drilled tube benzene  
 reads 0 ppm

pumped 15 times & remain  
 for 5 mins for conservative  
 reading

TD = 10'  
 Shut down drilling on  
 this soil being.

— strong petroleum fumes  
 — will ghost ASAP.

1630 Borehole after augers have  
 been removed — 192 ppm  
 over borehole — 25 ppm  
 Kathy Pistlett

(66)

1635  
1730

5/15/95

Drillers depart Site 25  
Kathleen Merino  
and Destiny Greenway  
depart Duluth ANGB  
for Federal Express  
(3) soil samples  
& (1) duplicate  
(1) Trip blank

(67)

Tuesday 5/16/95

Weather: Cloudy, showers  
earlier, showers expected this  
morning (?); 50's; gentle  
wind - foggy on the hill  
645 arrived at Duluth ANGB

Joe Byrd, Jr.  
Kathleen Merino

Destiny Greenway  
Kathryn Pittsott  
Calibrated PID &

MX251 as per  
procedure stated on  
Pg 20 of this field  
logbook

Health & Safety

meeting Destiny Greenway  
Kathleen Merino  
Kathryn Pittsott  
Jamee Tuura  
Jonathan Gabriel

Jamee Tuura informed  
us that he felt ill  
into the night, he felt  
fine this morning  
Kathy Pittsott

Kathy Pittsott

(68)

5/10/95

Jonathan Gabriel said  
that the fumes smelled  
nauseated but he felt  
fine last night & this  
morning.  
Everyone else felt  
fine.

Try to contact Paul  
Wheeler (ANGRC) at  
715 in Michigan with  
Capt. Wabrowetz - left  
message.  
Located at 025-007 BH  
Collected 0.5-2.5'

815-  
817

Borehole  
+ BG 0 ppm  
0 LEL 20.5% O<sub>2</sub>  
Collected 5-7'

825

Borehole 0 ppm  
0 LEL 20.5% O<sub>2</sub>  
Collected 10-12'

835

Borehole 0 ppm  
0 LEL 20.5%  
Kathy Pittsford.

5/16/95 (69)

840 Collected 15-17'  
Oppm  
Borehole 0 ppm  
LEL vent - batteries  
Dierker believe he may  
have encountered water  
at ~ 14.5' BLS  
Collected 20-22'

852 0.5 ppm  
Borehole 0 ppm  
0 LEL 20.4% O<sub>2</sub>  
Move to 025-005 BH  
Called Russell Cason  
(Capted) informed him  
Collected 0.5-2.5'

910

903

931

Borehole 0 ppm  
1.5 ppm BG 1.5 ppm  
0 LEL 20.5% O<sub>2</sub>  
Collected 5-7'

938

Di Recovery

Borehole 0 ppm  
1.5 ppm 1.5 ppm BG

950

0 LEL 20.4% O<sub>2</sub>  
Collected 10-12'  
1.5 ppm BG 1.5 ppm

Borehole 0 ppm  
20.4% O<sub>2</sub>  
Kathy Pittsford 0 LEL 20.4% O<sub>2</sub>

20

5/16/95

- much advancing to the surface ~ 15' BLS  
→ may be perched water (?)

1000

Borehole

collected 18-20'

0% Recovery

0 ppm

OLEL 20.4% O<sub>2</sub>

collected 20-22'

0 ppm

1345

Borehole

OLEL

20.5% O<sub>2</sub>

Dillers decontaminating

surface as per procedures

stated on page 24

of field logbook.

moved to 36.5-004BH

collected 0.5-2.5'

0 ppm

collected 5-7'

0 ppm

collected 10-12'

0 ppm

Borehole

OLEL

20.4% O<sub>2</sub>

Kathy Pittsford

71

5/16/95

Borehole 0 ppm

OLEL 20.4% O<sub>2</sub>

collected 18-20' BLS

1150

0 ppm

Borehole

OLEL

20.4% O<sub>2</sub>

moved 021-026BH

collected 0.5-2.5'

9.1 ppm

collected 4-6'

1355

2.8 ppm

collected 8-10'

1405

Borehole

0 ppm

OLEL 20.5% O<sub>2</sub>

Recollecting 0.5-2.5'

0 ppm

moved to 021-027BH

collected 0.5-2.5'

Borehole

0 ppm

OLEL 20.5% O<sub>2</sub>

collected 4-6' oppm

0 ppm

OLEL 20.5% O<sub>2</sub>

Kathy Pittsford

1448

Borehole

0 ppm

OLEL 20.5% O<sub>2</sub>

collected 4-6' oppm

0 ppm

OLEL 20.5% O<sub>2</sub>

Kathy Pittsford

1425

1438

1448

1458

1468

1478

1488

1498

1508

1518

1528

1538

1548

(72)

1458

5/16/95

collected 8-10' o.s.

Dppm

duplicate collected

Moved 021-028BH

collected 0.5-2.5'

Dppm

collected 4-6'

Dppm

water encountered

called Paul Wheeler

(ANGRC) to discuss

an additional soil boring

west of MORGs area

— yes → just

drill 20' ~~ft~~ less at

Site 17 for adjustment

of cost.

Dillers

grouting

boreholes

as per work

Plan

Arrived at Federal

express

equipment invoice

(1) equipment invoice

(4) soil samples

Kathy Swickson

1545

1610

1700

airbill

#

4530735790

1717

5/16/95

(73)

Arrived at Lake

Superior Laboratories

(6) soil samples

(1) Duplicate

(1) ms/msd

COC No. 12592

Kathy Swickson

(74)

Wednesday

5/17/95

Weather: Sunny cool -  
high 50's; low 40's; wind chill  
~30°F; windy; NW  
10-15 mph

645 Arrived at Duluth ANG  
arrived at 600  
Dusty Greenway  
Kathryn Fitchett

for Byrd, Jr.  
Calibrated PID &

700

MX251 as per procedures  
stated on page 20 of  
this field logbook.

730

Dillers arrived

Jonnie Turner

Jonathan Gabriel

745

Dillers decontaminating  
suits as per procedures  
stated on page 21 of this  
field logbook.

820

Finished decontaminating  
Platt & Safety meeting

Jonnie Turner

Jonathan Gabriel

5/17/95

(75)

Dusty Greenway  
Kathleen Marino  
Kathryn Fitchett

830 Moved to 0.25-0.125H  
(north of mesa area)  
Collected 0.5-2.5'

838

843 0 ppm  
Collected 5-7'  
9.6 ppm

Boothole  
at BG

850

0 ppm  
O<sub>2</sub> EL 20.5% O<sub>2</sub>  
Collected 10-12'

7.5 ppm

Boothole

8.5 ppm before  
sample  
0 ppm after sample  
O<sub>2</sub> EL 20.5% O<sub>2</sub>

900

Collected 15-20'  
4.5 ppm

Boothole

3.5 ppm  
2.2 EL 20.5% O<sub>2</sub>

919 (west  
of BG)

Moved to 0.25-0.08H  
Collected 0.5-2.5'

926

0 ppm

Boothole

0 ppm  
O<sub>2</sub> EL 20.5% O<sub>2</sub>

Kathryn Fitchett

(76)

5/17/95

Collected 5-7'

Borehole

0 ppm

0 LEL 20.5% O<sub>2</sub>

Collected 10-12'

0 ppm

Borehole

0 ppm

0 LEL 20.4% O<sub>2</sub>

Collected 16-20'

0 ppm

Borehole

0 ppm

0 LEL 20.5% O<sub>2</sub>

1100

Dullers decontaminating  
drilling augers as  
per procedures stated on  
page 24 of this field  
logbook

1020-

1100

Dullers grouted boreholes  
Setting up at Site 17

1100-

1130

Dullers left Durrith Area  
to mobilize to Site 17

1145

Kathy Patchett

(77)

5/17/95

017-024 BH

Collected 0.5-2.5'

0 ppm

Collected 4-6'

0 ppm

Borehole

0 ppm

4 BG 0 LEL/ppm 20.5% O<sub>2</sub>

Perf 1 Silt 0-6.5'

6.5-10'

Silt w/ water and

Moved to 017-025 BH

Collected 0.5-2.5'

0 ppm

Silt & perf

Collected 4-6' Perf

Water encountered

0 ppm

Borehole

0 ppm

0 LEL 20.5% O<sub>2</sub>

Moved to 017-022 BH

Collected 0.5-2.5'

0 ppm

Collected 4-6'

Water at 3.5' 20% Recovery

Borehole

0 ppm

0 LEL 20.5% O<sub>2</sub>

Kathy Patchett

(48)

5/17/95 017-023 BH  
moved to 024BH  
1445 Collected 0.5-2.5'  
1458 0 ppm  
1507 Collected 4-6'  
0 ppm  
Water encountered at ~4' Bld  
1520 moved to 017-028BH  
1535 Collected 0.5-2.5'  
0 ppm  
1544 Collected 4-6'  
0 ppm  
water encountered 0 ppm

note: It was a prairie-willow  
dry at Site 17  
Collected effluent  
insecte - split open  
Site 17

1600

WDNR 3/40-ml ~~to~~ HCL  
GEO/DEO  
SIOC (8270) 11) 1L amber  
Hg (7470) 11) 1L Poly HNO<sub>3</sub>  
/645 meet Lake Superior Lab  
at Duluth ANG's  
WDNR 19) Soil Samples  
GEO/DEO 11) Equipment Permitte  
Kathy Pittsford

(79)

5/17/95  
1715 Arrived at Federal  
Express  
1745 Arrived at Site 17 to  
load supplies  
1830 Depart Duluth ANG's

18

Kathy Pittsford



⑧ Thursday 5/18/95

Weather: Sunny; 60°  
645 Arrived at Duluth  
ANCB

Joe Byrd, Jr.  
Destiny Greenway  
Kathleen Marino  
Kathryn Pittblott

715 PID were calibrated  
by Joe Byrd, Jr.  
as per procedures stated  
on page 20 of this

field logbook

Called (Kathleen)

Lake Superior Lab-  
(Tim Buck) to confirm

obtaining analytical

results for soil

samples delivered

Tuesday + Wednesday —

Stated that these were

a 24-hour turnaround

called Russell Coon

about the above —

off he will inform  
Mark Escobar (Optek)

Kathryn Pittblott

5/18/95 ⑧

940 arrived at 025-001m

Kathleen Marino

Kathryn Pittblott

Joe Byrd, Jr. and

Destiny Greenway

at Site 26 collecting

groundwater samples

1018 PID 22.64 ppm

W.L. = 22.91 ppm BTOC = 22

TD = 39.81, BTOC = 22

Transducer 17.10

1146 Start slug test

— injection at 025-001m

1240 stopped test

~~1244~~ Started withdrawal

1242 test at 025-001m

1337 stopped test

1345 stopped to cool down

— been in sun too

long.

1515 025-003m

53.0 ppm

W.L. 40.0 ppm BTOC

TD: 22.00, BTOC

Kathryn Pittblott

(82)

5/18/95

1531 11:05 ' Tamadua  
Static  
1534 Start injection  
test - 625-03ms  
1638 stopped test  
1640 started withdraw  
test  
1800 stopped test  
1845 Depart Duluth  
ANGB

Friday 5/19/95

(83)

Weather: Sunny; 50-60°  
Light winds  
645 Arrived at Duluth ANGB  
Debra Greenway  
Kathleen Marino  
Joe Boyd / Dr.  
Kathy Pritchett  
715 Calibrated PIDs &  
MX251 as per procedure  
stated on page 20 of this  
field logbook  
825 Called KREM -  
will meet them at  
1530 at Site 25  
870 Puller arrived with  
chill rig  
885 Health & Safety meeting  
Debra Greenway  
Kathleen Marino  
Janice Turner  
Jonghan Goprial  
Kathy Pritchett  
844 Moved to 0176-0515H  
853 collected 0.5-2.5  
25% recovery  
Kathy Pritchett

(84)

5/19/95

858 Collected 4-6' BG  
water encountered 0 ppm  
Recollected 0.5-2.5'  
25% Recovery  
0 ppm

910 Recollected 0.5-2.5'

915 moved to 017-021 BH  
920 Collected 0.5-2.5'

925 0 ppm  
collected 4-6'

935 water encountered 0 ppm  
942 Moved to 017-032 BH  
Collected 0.5-2.5'

957 water encountered  
1004 moved to 017-030 BH  
Collected 0.5-2.5'

1010 0 ppm water encountered  
Collected 4-6' KD

1020 0 ppm  
Duplicate collected for  
TPH GRO/DEO  
Moved 017-029 BH

Kathy Pittsford

(85)

5/19/95

1027 Collected 0.5-2.5'  
water encountered 45% Recovery  
1035 Recollected 0.5-2.5'

0 ppm  
Duplicate collected  
for SWC, Hy (SPL)  
& TPH (Lake Superior)

1040- Drillers grout  
1110 drill pouring with  
3% bentonite powder &  
97% neat cement

1130-1230 Lunch  
1240 Collected equipment  
insecticide - split

WDNR GRO/DEO (3) 40 mL vial HCL  
SWC (8270) (1) 1 L amber  
Hy (7470) (1) 1 L Poly HNO3  
1330 Meet Lake Superior Lake  
at Duluth ANCO Gate  
to relinquish:

- (7) 50:1 Sample
  - (2) Duplicate
  - (1) MSD/MSD
  - (1) Equipment Rinsewater - split upon
- Kathy Pittsford

(86)

5/19/95

1340

Arrived at 025-002mw  
to slug test

W.L. 7.32' B70C'  
10:33 T.D. 17.45' B70C'

1400

Started injection test  
at 025-002mw

~1450  
1505

Stopped test  
Started withdraw  
test

1530

Bill Anderson with  
RREM arrived at

Site 25 to work over  
Sites 25, 21, 26 & 17-

1630

for surveying  
Return to Duluth ANG B  
to pack samples

1730

Depart Duluth ANG B

1815

for Federal express  
Return to Duluth  
ANG B

1830

Depart Duluth ANG B

1840

Dropped Kathleen ~~from~~  
Merino at the airport

~~RP~~  
Kathy Pritchett

Saturday

5/20/95 (87)

Weather: Sunny, 90-56°  
Wind from the west - cool.  
☺

645 arrived at Duluth ANG B

Destry Greenway

Joe Byrd Jr.

Kathryn Pritchett

arrived at Site 26

Destry Greenway

Kathryn Pritchett

to slug test monitor

Wells

026-001mw

W.L. 17.03' B70C

T.D. 25.28' B70C

Started sp injection  
test at 026-001mw

~814

Stopped test

Started withdraw

test

Stopped test

Moved to 026-003mw

W.L. 7.36' B70C

T.D. 17.92' B70C

Kathy Pritchett

(88) 935

434

1007

1009

1049

1125

1145-1230

1245

Started injection  
test at 026-003 MW

Stopped test

Started withdraw

test

Stopped test

Depart Site 26

Unich

Arrived at Site 26

Destry Greenway

Kathryn Pittsott

Joe Byrd, Jr. at

blby 247 running

water samples on GC

Moved to 026-002 MW

W.L. 9.50'

T.D. 21.40'

Started injection test  
at 026-002 MW

Stopped test

Started withdraw test

Stopped test

Depart Site 26

Arrived at Federal

Express-

Kathryn Pittsott

5/20/95

Started injection  
test at 026-003 MW

Stopped test

Started withdraw

test

Stopped test

Depart Site 26

Unich

Arrived at Site 26

Destry Greenway

Kathryn Pittsott

Joe Byrd, Jr. at

blby 247 running

water samples on GC

Moved to 026-002 MW

W.L. 9.50'

T.D. 21.40'

Started injection test  
at 026-002 MW

Stopped test

Started withdraw test

Stopped test

Depart Site 26

Arrived at Federal

Express-

Kathryn Pittsott

5/20/95 (89)

Arrived at Duluth

ANCOB -

check site 25 -

wanted drums

id to hold off until

analytical results

Depart Duluth

ANCOB

1640

1730

Kathryn Pittsott

# HEARING AIDS - CHARTS

DATE: \_\_\_\_\_

NAME: \_\_\_\_\_

AGE: \_\_\_\_\_

SEX: \_\_\_\_\_

TESTED: \_\_\_\_\_

TESTER: \_\_\_\_\_

TESTED BY: \_\_\_\_\_

TESTED AT: \_\_\_\_\_

TESTED FOR: \_\_\_\_\_

Destry Greenway with  
Operational Technologies  
4100 NW Loop 410 Ste. 230  
San Antonio, TX 78229  
1-800-677-8072

Duluth ANG 1315-197

①

# Decon Procedure

1. Wash with mix of potable water and Liqinox. Scrub with brush
2. Rinse with potable water
3. Rinse with deionized water
4. Allow to air dry completely
5. Wrap with aluminum foil (shiny side out.)

No further entries  
Desty Greeny

CONTENTS

REFERENCE

1 Decon procedure

DATE

②

Friday 4-28-95

16:15 Pre-mob meeting for Duluth ANG

17:30 Meeting over

No further entries  
Deety Dreaming

③

Monday ~~4~~<sup>8:00</sup> 5-1-95

04:30 Depart for Duluth

14:40 Arrive in Duluth

14:50 Begin unloading equip., etc.

15:25 Begin staking locations for site

16:20 Leave base

17:00 Arrive at motel to check in.

No further entries  
Deety Dreaming



④

Tuesday 5-2-95

07:15 Leave motel  
 08:00 Breakfast meeting  
 08:40 Arrive at base  
 09:20 Called Fedex to track packages  
 09:30 Prepare stakes for Site 26 & Site 17.  
 10:20 Head to Site 26 to stake BH's.  
 11:10 Site 26 completed  
 12:30 Return from lunch. Unload GC stuff  
 13:25 Go to store to get supplies  
 14:50 Return from store  
 15:10 Begin helping Joe with GC set-up and cutting squares (Teflon & foil)  
 16:20 Put visqueen on sample table & decon table  
 16:50 Leave base

No further entries  
 Dirty Creamy

⑤

Wednesday 5-3-95

05:50 Leave motel  
 06:40 Depart breakfast  
 06:45 Arrive at base. Load equip. for moving to Site 26.  
 07:25 Calibrated PIDs. to 100 PPM  
 10:30 Break for lunch  
 11:20 Return from lunch  
 11:45 Arrive at Site 26. Set up decon.  
 12:15 Health and Safety meeting with drillers and Optech team.  
 12:25 Begin decon 026-006BH  
 13:35 026-006BH completed  
 13:40 Begin decon 026-005BH  
 14:15 026-005BH completed  
 16:20 Leave Site 26. Go to bldg 247 to prepare <sup>200</sup> samples.  
 17:35 Leave base

No further entries  
 Dirty Creamy

⑥

Thursday 5-4-95

0550

Leave motel

0640

Depart breakfast

0650

Arrive at base. Load equip. to return to Site 26.

0800

Go to fire dept.

0810

Return from fire dept.

0815

Drillers deconning equip. (start)

Decon procedure is as follows.

1. Steam clean with mix of

potable water and Ligninox

2. Steam ~~clean~~ <sup>rinse</sup> with potable

water

3. Augers wrapped in visqueen

0835

Decon of augers complete

0850

Arrive at Site 26

0855

Health and Safety meeting with drillers and Optech crew.

0900

Set up decon and sample prep tables.

0910

Begin decon (procedure explained on page 1.) on Site 26

1205

Break for lunch

1330

Return from lunch

⑦

Thursday 5-4-95 (continued)

1350

Take pictures of grouting by drillers.

1435

Resume decon at Site 26

1445

Leave Site 26

1515

Equip. blank

1520

Return to Site 26

1555

Leave Site 26

1600

Return to bldg 247. Unload

equip. Prepare for next day.

18:30

Leave base

No further entries  
Dusty Drummy

⑧

Friday 5-5-95

0550 Leave motel  
 0640 Depart breakfast  
 0650 Arrive at base. Begin to load <sup>equip.</sup> ~~unload~~  
 0800 Arrive at Site 26. Set up decon.  
 0810 Health & Safety meeting with drillers & Optech crew.  
 0820 Begin decon (see p. 1)  
 1015 Decon complete  
 1215 Leave Base for lunch  
 1330 Return from lunch. Observe drillers completing well.  
 1530<sup>DM</sup> Leave Site 26  
 1550<sup>DM</sup> 1615 Leave base

No further entries  
 Dusty Greeny

⑨

Saturday 5-6-95

0550 Leave motel  
 0640 Depart breakfast  
 0645 Arrive at base. Load equip. for the day  
 0720 Arrive at site 26. Set up decon  
 0805 Health and Safety meeting with drillers and Optech crew.  
 0805<sup>DM</sup> Begin decon. (See pg. 1)  
 0935 Decon complete. Observe drillers completing well.  
 1110 Break for lunch  
 1200 Return from lunch  
 1215 Arrive at Site 26. Begin decon  
 1345 Decon complete  
 1425 Leave Site 26  
 1440 Leave base

No further entries  
 Dusty Greeny

(10)

Monday 5-8-95

0555 Leave base  
 0640 Depart break fast  
 0650 Arrive at base  
 0720 Set up and take count of sample kits.

0830 Programmed GC & built all 3 standards under supervision of Joe Byrd-GC operator

Gain 1000  
 Carrier Gas Flow 14 mL/min  
 Injection vol. 100 µL ~~10 µL~~  
 GC Oven temp. 400°C  
 Analysis time 400 sec.

0954 100 PPB BTEx standard -

1010 Missed shot  
 100 PPB BTEx standard

1029 Good run. Set library  
 1 PPM BTEx standard

1045 Good run. Set library  
 10 PPM BTEx standard

1059 Good run. Set library  
 Air blank \*

(11)

Monday 5-8-95

\* Benzene 12 ppb  
 \* Toluene 30 ppb  
 \* Ethylbenzene 79 ppb  
 \* m,p-xylene 155 ppb  
 \* o-xylene 76 ppb  
 unusually high values. Shoot air blank again

1113 Air blank

\* Benzene 5 ppb  
 \* Toluene 16 ppb  
 \* Ethylbenzene 41 ppb  
 \* m,p-xylene 92 ppb  
 \* o-xylene 185 ppb

1124 Printer malfunction. Need to reprint

1135 Break for lunch

1240 Return from lunch

\* 026

026-002 MW 20'-22' 10 g.

\* Benzene 4 ppb  
 \* Toluene 6 ppb  
 \* Ethylbenzene 7 ppb  
 \* m,p-xylene 13 ppb  
 \* o-xylene 11 ppb

1307 100 ppb BTEX Standard

	cal
Benzene	99
Toluene	80
Ethylbenzene	72
m,p-xylene	133
o-xylene	47

1319 Shut down GC.

1319 Shut down G.C.  
+ ~~go~~ Return to decon brass sleeves  
at bldg. 247 (See pg. 1)

1425 Decon complete. Wrap tables for  
next day.

1530 Leave base

1530 Leave base

~~No further entries  
Desty Dreaming~~

Tuesday 5-9-95

0605	Leave motel
0700	Depart breakfast
0705	Arrive at base. Wrap brass sleeves
	Recharge PIDs.
0740	Leave base. No work due to very rainy weather.

No further entries  
Desty Greening

(14)

Wednesday 5-10-95

10555 Leave motel  
 10640 Depart breakfast  
 10645 Arrive at base. Set up decon, get ready for drilling at Site 25.  
 10740 Begin decon (see pg. 1)  
 10810 Health and Safety meeting with drillers and Optech crew.  
 0815 Resume decon  
 1130 Decon complete. Break for lunch  
 1230 Return from lunch. Observe drillers completing well. Move decon equip. to next well.  
 1430 Begin decon  
 1700 Decon complete. Check on Joe at Site 26.  
 1755 Leave base

No further entries  
 Datz, Breamy

(15)

Thursday 5-11-95

0550 Leave motel  
 0640 Depart breakfast  
 0645 Arrive at base. Set up decon. prepare for day's drilling.  
 0740 Health and Safety meeting with drillers and Optech crew.  
 0815 Copy log forms and field notebooks  
 0900 Copying complete. Observe Joe and GC work.  
 1100 Break for lunch  
 1205 Arrive at Site 17 to check stakes  
 1225 Arrive at base. Prepare for 225-003 MW.  
 1400 Begin decon (see pg. 1)  
 1505 Decon complete. Break down everything.  
 1650 Leave base

No further entries  
 Datz, Breamy

(16)

Friday 5-12-95

10550 Leave motel  
10640 Depart breakfast  
10650 Arrive at base. Calibrate Hydacs  
and turbidity meters.  
10710 ~~Call base~~ Set up decon.  
10725 Health and Safety meeting with  
drillers and Optech crew.  
1015 Begin decon (see pg. 1) on Site 25  
boreholes  
1130 Break for lunch  
1240 Return from lunch. Begin decon.  
1600 Decon complete. Break down equip.  
Prepare for Monday.  
11725 Leave base  
11730 Arrive at FedEx  
11740 Leave FedEx

No further entries  
Duty Drilling

(17)

Monday 5-15-95

0550 Leave motel  
0640 Depart breakfast  
0645 Arrive at base. Set up decon, other  
equip.  
0800 Begin decon (see pg. 1)  
0930 Health and Safety meeting  
0935 Resume decon  
1130 Break for lunch  
1220 Return from lunch. Resume decon  
1225 Go to store to get supplies.  
1300 Return to base. Resume decon  
1430 Decon complete. 025-002BH  
was discontinued because of  
LEL alarm after confering with  
drillers.  
1520 Resume decon  
1655 Decon complete. Break down  
equip.  
1735 Leave base  
1740 Arrive at FedEx  
1750 Leave FedEx

No further entries  
Duty Drilling

(18)

Tuesday 5-16-95

0550 Leave motel  
0640 Depart breakfast  
0645 Arrive at base. Set up decon. Prepare  
for day.  
0745 Health and Safety meeting with  
drillers and Optech crew.  
0810 Begin decon (see pg. 1)  
1200 Decon complete. Break for lunch  
1320 Return from lunch. Resume decon  
1605 Decon complete. Break down  
equip.  
1740 Leave base

~~No further entries  
Dusty Drummy~~

(19)

Wednesday 5-17-95

0555 Leave motel  
0620 Arrive at base  
0730 Begin decon (see pg. 1)  
0825 Health and Safety meeting  
0920 Decon complete. Break down  
equip. Site 25  
1055 Leave Site 25  
1115 Arrive at Site 17. Set up equip.  
for sampling.  
1155 Break for lunch  
1310 Return from lunch  
1325 Begin decon  
1705 Decon complete. Pack up equip.  
Leave Site 17  
1800 Arrive at Base  
1810 Leave base  
1825

~~No further entries  
Dusty Drummy~~



(20)

Thursday 5-18-95

0550 Leave motel  
0650 Depart breakfast  
0655 Arrive at ~~breakfast~~ base. Load  
equip. for sampling wells.  
0715 Calibrated Hydracs  
0755 Arrive at Site 26  
0800 Decon bailers and H<sub>2</sub>O level  
level meter.  
0840 Set up at well H026-001MW  
0845 Begin purging  
0935 Purging completed.  
0953 Field blank taken. see  
Rinstate blank taken  
11015 026-001MW sampling begins  
11020 Sampling complete. Decon bailer  
11040 Arrive at ~~base~~ and set up at  
026-002MW.  
11045 Begin purging.  
1125 Purging completed  
1130 Begin sampling  
1140 Sampling completed. Decon bailer  
11205 Arrive and set up at ~~base~~ 026-003MW  
Begin purging.

(21)

1215 Rinstate blank taken  
1225 Begin purging  
1310 Purging completed.  
1335 Begin sampling  
1355 Sampling completed.  
1410 Leave Site 26.  
1430 Set up decon at Bldg 247.  
1440 Begin decon  
1449 Decon complete  
1500 Break for lunch  
1515 Lunch over  
1520 Arrive at Site 25. Set up  
for 025-002MW  
1525 Begin Purging  
1628 Purging completed  
1700 Begin Sampling  
1710 Sampling completed. Break  
down equip.  
1725 Leave base  
1730 Arrive at Fedex  
1750 Leave Fedex  
1800 Arrive back at base  
1825 Leave base

No further entries  
see Entry

(22)

Friday 5-19-95

- 0555 Leave motel  
0640 Depart breakfast  
0645 Arrive at base. Load equip. for site 17.  
0725 Arrive at Site 17. Set up equip.  
0830 Health and Safety meeting with drillers and Optech crew.  
0850 Begin decon (see pg. 1)  
1045 Decon complete. Break down equip.  
1130 Break ~~down~~ for lunch  
1230 Return from lunch  
1345 Take rinsate blank  
1310 Arrive at 025-001MW. Set up equip.  
1315 Begin purging  
1420 Purging completed.  
1425 Take potable water field blank while waiting for 025-001MW to recharge.  
1520 Sampling complete  
1530 Take rinsate blank.  
1550 Arrive at 025-003MW to set up.  
1555 Begin purging

(23)

- 1635 ~~Done~~ purging completed. Waiting for recharge  
1705 Sampling begins  
1730 Sampling complete. Move GC equip.  
1835 Leave base.

No further entries  
Dusty Dreaming

(24)

Saturday 5-20-95

0555 Leave motel  
0645 Depart breakfast  
0655 Arrive at base. Load truck for  
slug testing  
0730 Arrive at 026-001 MW. Set  
up equip. to slug test.  
0910 Arrive at 026-003 MW. Set  
up equip. to slug test.  
1120 Left Site 26.  
1145 Lunch break  
1230 Lunch over  
1255 Arrive at Site 26. Arrive at  
026-002 MW. Set up equip.  
to slug test.  
1415 Leave Site 26.  
1420 Arrive at Bldg 247 to  
pack up to leave Duluth.  
1605 Leave base to go to FedEx  
1620 Arrive at FedEx  
1635 Depart FedEx  
1640 Arrive at Base. Marked  
drums.  
1725 Leave base

No further entries  
Duty Ending

4100 NW Loop 410, Ste 230  
San Antonio, TX 78229  
(210) 731-0000 1-800-677-8072

Duluth SI Sites 26, 25

Radisson Hotel (218) 727-8981

CONTENTS

REF ID: A DATE

K.M. Kathleen Herino  
 K.P. Kathryn Pritthead  
 D.G. Destiny Greenway  
 J.B. Joe Byrd

1 May 95

0515 Depart for SA Airport

0620 Flight departs for Duluth, MN

~~914~~ 1245 Arrived at Duluth Airport

1315-1400 LUNCH

1400 Arrived at Base met w/ Bruce Berg

1430 Met with base security - Capt Kovach

1515-1615 Staked locations at Site 25

1630 Left base

END OF DAY

A. Herino

2

2 May 95

3

0700 Met Hotel Lobby

0715-0830 Breakfast and

Planning meeting  
for days events  
Organized supplies  
and stake site 26  
locations

0845-1115

1130-1230 LUNCH

1203-1315

K.M. organized  
it inventoried  
sample bottles  
from lab.

1315-1525

Prepared labels  
for samples

1525-1630

Staked locations  
at site 17 and  
returned to  
base.

1645

Left base.  
END OF DAY

*[Signature]*

3 May 95

5

0545 Met in hotel lobby and  
departed for breakfast

0600 - Breakfast and

0645 planning meeting

for day.

0700 Prepared supplies for

drilling.

Drillers arrive and

begin decon angers

etc. at area south of

hill (at site 25).

0800

-0930

Decon was accomplished  
by preparing site with  
pallets w/ plastic on top  
and bottom and placing  
anger flights on top of  
plastic covered pallets.  
Water source was  
tank on truck with  
water from the City  
of Duluth. Water (steamer)

was clear from truck  
tank. Truck & driller  
rig decon w/ steamer

A. R. R. R.

6

M  
L

3 MAR 95

7

0930- Driller rinse truck, auger  
0955 w/ liquinox soap.1030-1120 LAMCH  
1130 Prepared site 26 for  
soil boring drilling  
1215 Site Safety Meeting  
1230 Began drilling  
[026-006 BH]7/9/9/7 0.5-2.5 BLS 4cm  
1245 sample @ 2.0-2.5 124511/3/19/10 S-7 BLS  
1300 sample @ 5.5-712/14/17/21 870 BLS  
sample @ not collected  
no recovery9/15/20/21 10-12 BLS  
sample @ 11.5-12 1320

TD = 12' BLS

A. K. M



3 MAY 95

1335 Moved to [026-005BH]  
 1340 drove 1st spoon 0.5-2.5'

~~3441115~~ 5-7' am 0.5-2.5 BLS  
 1345 sample @ 2.0-2.5 (1.5-2.5)\*  
 1348 dup sample @ 1.5-2 (1.5-1.5)\*

\* lab designation  
 1356 6.5-7 sample @ collector  
 for lab

1400 9.5-10 sample collected  
 for lab

TD = 10' BLS

1420 Moved to [026-004BH]  
 1432 sample @ 2.0-2.5 BLS

poor recovery at 5-7 BLS  
 sample @ 7.5-10 BLS

Auger 2 1/2 ID  
 Borehole diameter 6"  
 Geologist: Kathleen Merino

1535 ~~026-001BH~~  
 sample @ 9.5-10.0  
 sample @ 7.0-9.5 ms/m

*A. M.*

*no cutting  
 11/11/95*

3 MAY 95

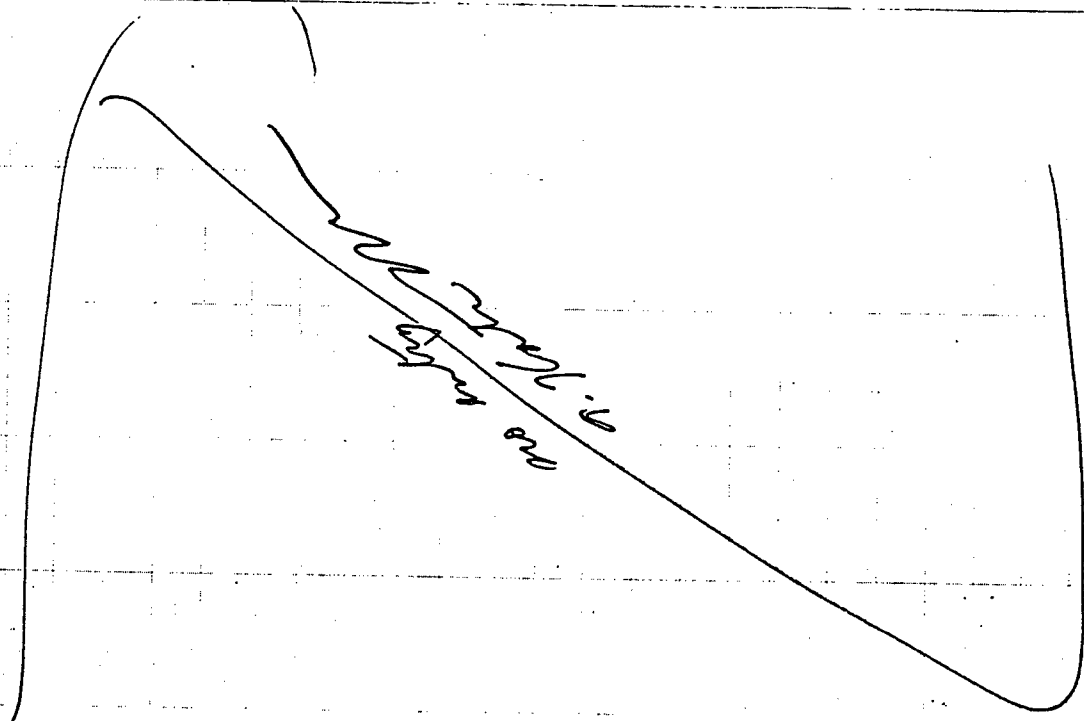
11

1540 second hole at 026-001 BH  
 sample @ 2.0-2.5 BLS  
 1545 second hole at 026-001 BH  
 sample @ 6.5-7.0 BLS  
 Beam cleaning up site  
 1650 collected cleanup sample  
 blank @  
 1655 Prepare COC and organize  
 samples  
 1800 Dropped samples of 2  
 at feed = X  
 Air bill #4530735123  
 Samples sent:

026-001 BH	2-2.5	8240	8270
026-001 BH	9.5-10	6010	7196 7421
026-004 BH	2-2.5		
026-004 BH	9.5-10		
026-005 BH	1.5-2.5		
026-005 BH	9.5-10		
026-006 BH	11.5-12		
026-006 BH	2.0-2.5		
026-005 BH	0.5-1.5		
026-001 BH	9-9.5 MS/MSD		
EB JVDA	8240		
EB LL	8270		
EB .5L	6010 7196 7421		

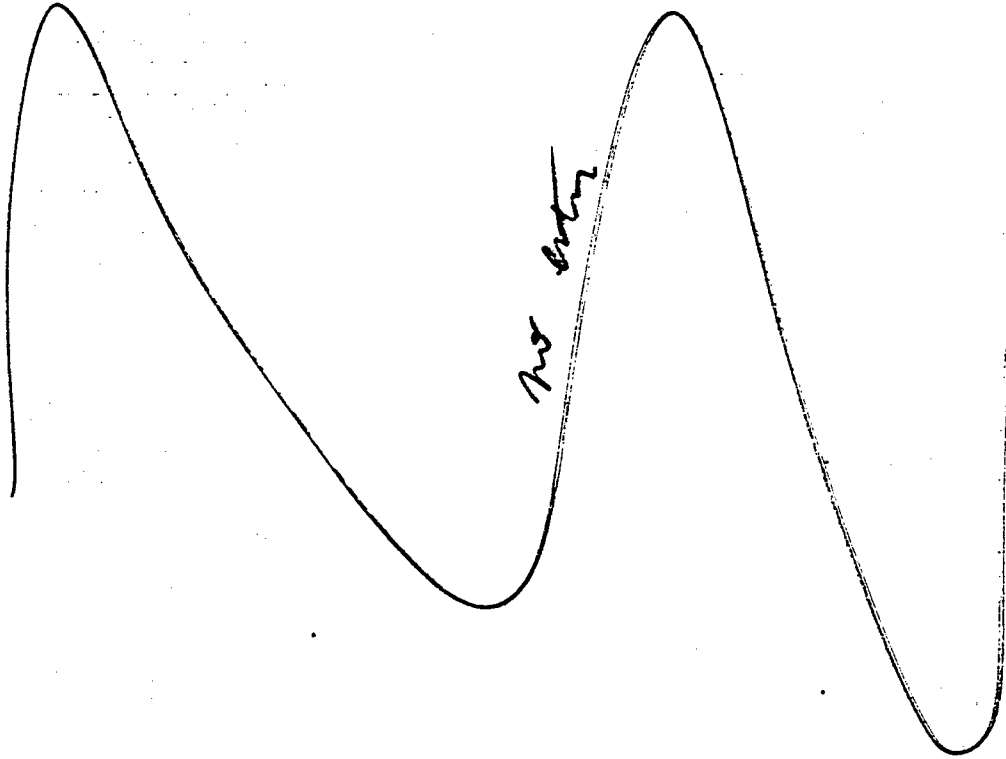


12-



no water  
in lake

3 MAY 95 13  
1815 Arrive back at Hotel  
END OF DAY



no water

A. K. D.

14

Long  
No

15

4 May 95

0545 Met lobby, breakfast  
-0640 planning meeting

0655- Arrived at site, loaded  
0715 Van. Waiting for  
drillers.

0715- Contacted fire dept. for  
0815 water supply for drillers  
truck tank.

0815- Drillers disconnected auger  
0845 + light  
0900 Arrive site & begin site  
prep

0900- Health & Safety  
0910 Meeting

0915 Drillers mob to 026-002  
BH

0920 ~~Foot~~ water level = 6.8'

0922 Began drilling

026-002 BH

A. Johnson

top of  
ground

4 MAY 95

3/3/5/10

0.5-2.5 BLS  
No recovery. Sample  
collected @ 5-7' Water  
level ~ 5' BLS.  
Recovery problem on  
0.5-2.5 (moved hole over)  
4-6

0945

~~0945~~

Moved hole again

1007

0.5-2.0 BLS  
Sample @ 2.5-2.0

1120

sample @ 2.5-2.0  
from 026-003 BH  
sample @ 6.5-7.0  
Cleaning site

1125

1130

1145-

1245

1425

LUNCH  
Break

Waited for drillers  
to grant redrilling  
026-003 BH to collect  
duplicate sample  
for 026-003 BH

1435

sample @ 2.0-2.5  
(marked 1.5-2.5  
on log)  
sample @ 1.5-2.0  
(marked 0.5-1.5  
on log)

18

no P. [unclear]  
 [unclear] [unclear]  
 [unclear] [unclear]

19

4 MAY 95

1445 Returned to Bldg 247  
 to watch drillers decon  
 rig & truck

1515

Collect equip blanks.

1530

Return to site 26 to

~~1630~~  
 1630 am

begin drilling MWS

Driller needing rig  
 equipment cannot  
 proceed.

1700

Load truck and

-1800

leave site. Pack

sample cooler. take

samples to Fed Ex

Go to store for

1800-

1830

supplies

1845

Arrive back at hotel

Samples sent:

SOIL 026-002 BH 2-2.5

026-002 BH 6.5-7

026-003 BH 0.5-1.5

actually (1.5-2.0)

026-003 BH 1.5-2.5

actually (2.0-2.5)

026-003 BH 6.5-7.0

026-002-RB (3 VOA)

026-002-RB (16 Ambs)

END OF 1026

026-002-RB (5 Plus)

026-002-RB (5 Plus)

20

21

5 May 95

0545 Meet lobby Hotel 90  
to breakfast +  
planning meeting  
0635 Arrive at base  
-0745 load supplies

0800 Arrive Site 26

Begin drilling 026-00144  
Drilled down 22'  
water ~ 17.2'

0935

0945

water 17.2' BLS  
well constr: 026-00144

15-25' BLS screen  
13-26' BLS sand  
11-13' BLS bent  
4-11' BLS grout  
0-4' cement

1045 Randy Wolf arrived on  
site from AET, Inc.  
to bring well constr.

Equipment.

Wheelabrator Screens Sch 40 Slot 10  
Johnson # 29578C

# 29594C

Sand Red Flint #5/55

5 May 95

- 23  
 - 10 screen down hole  
 - (10' sections) 'cap' 411  
 (50) bags of sand  
 down hole

1230-

130

LUNCH

1430

1745

- 24.2 Bottom of screen  
 - Bentonite seal installer  
 - Well casing left  
 in hole w/ bentonite  
 seal, cement &  
 flush mounting  
 will be done at a  
 later time

1500

1615

Return to BLDG 247  
 to pack up supplies.

1645

Left site to go  
 ant to Target  
 for supplies  
 Returned to hotel

END OF DAY!

A. K. M.



24

6 May 95

0545

0645

0750

0800

0805

0832

0837

0900

0904

0920

0929

1000

Met for breakfast  
& planning meeting

Arrived on base  
load truck.

Drillers arrive

Decon split spools

Health & Safety  
briefing.

collar @ 5-7 from

Q26-003 MW

petite recollect

6.5-2.5 again collected  
poor recovery. 15-17\*

WI = 8.7 BLS

recollect 0.5-2.5

no recovery

WI = 6.3' BLS

WI = 6.3' BLS

set bottom

Screen at 15.5' BLS

\* Geotechnical sample

25

26

all day

27

6 May 95

1100

1200

1230

1300

1330

1500

1530

LUNCH

Returned to site

Began drilling

026-002 MW

sample @ 15-17

for geotechnical

well construction

left augers in

ground to allow

water to stabilize

Return to 86126

2471 unland

supplies

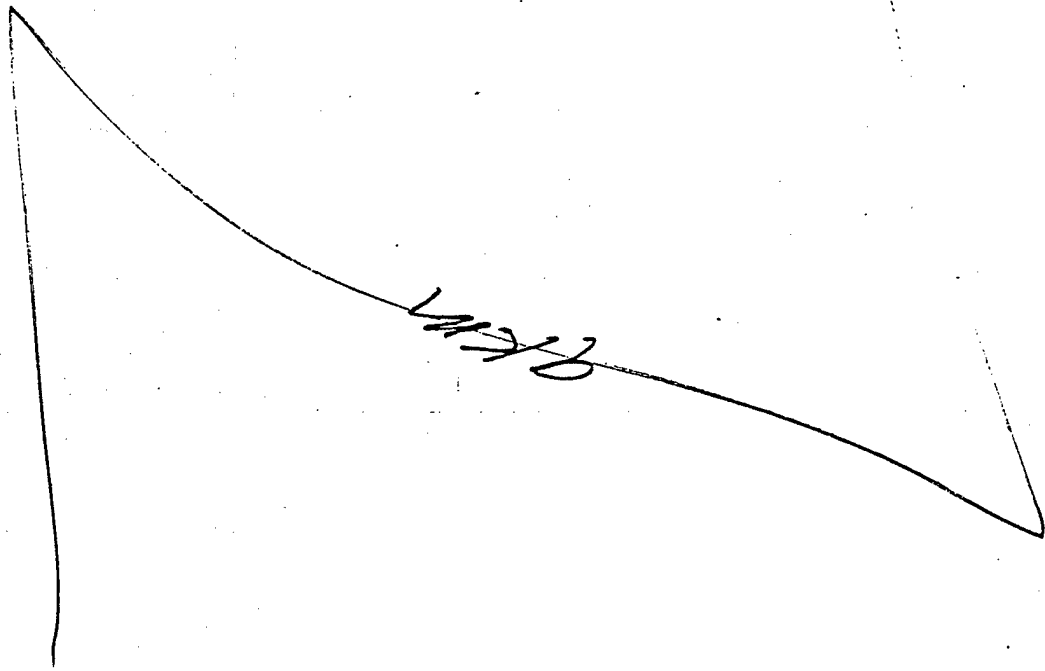
1612 site

END OF DAY

after

after

28



29

8 May 95

0545 Met lobby

Breakfast

0600  
-0645

Arrive on site  
load supplies in  
truck

0650

Drillers arrive on-  
site HES meetin

0800

Check water level  
at 026-002 NW

0820

wl = 13.4' BLS  
Drilling down to 22'  
due to wl measure-  
ent.

0830  
25117  
30

Lith sample from  
20-22 collected

0830

wl = 11.3 BLS

Begin well const.

1015

Top of sand 6.4'

Bit 65' - BLS  
Red 6' - bit sand

arr

30

plan

31

8 MAY 55

1030

Bottom of screen

15.4' BLS

ID: 20'

1130

Finish constr.

1135-

6.11.54

1345-

Arrive site 26-

1505

Surface completion

of well & leave

site due to

weather

1530

Depart Duluth-

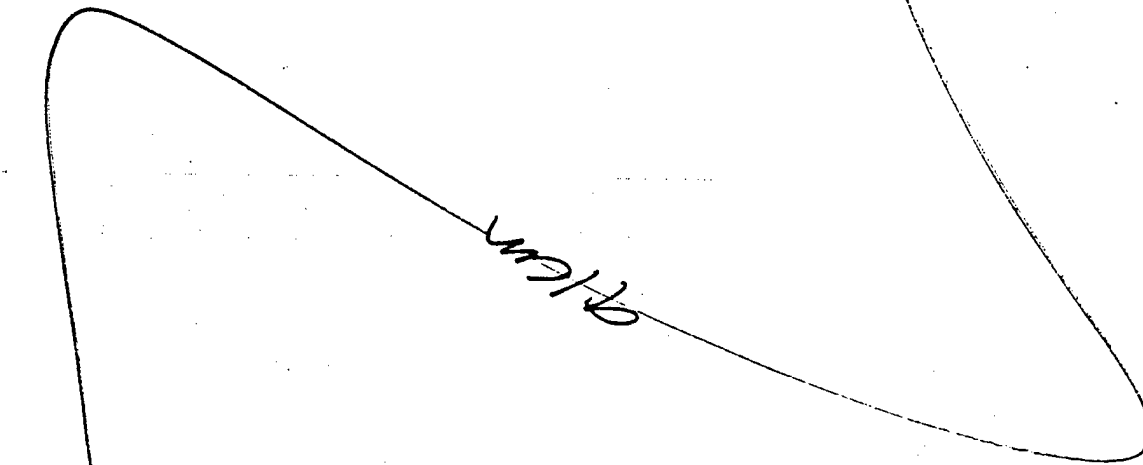
END

OF

DATA

OK

C. L. Thomsen



2/1 km

9 May 95

0645 Met lobby, check-out  
-0630 hotel. Breakfast  
and planning  
meeting

0645 Arrived on base.

Weather: rainy  
cold temp 40°F,  
wind chill 16°F

0700 Call drillers  
0800 Driller steam  
-1000 clean drill rig

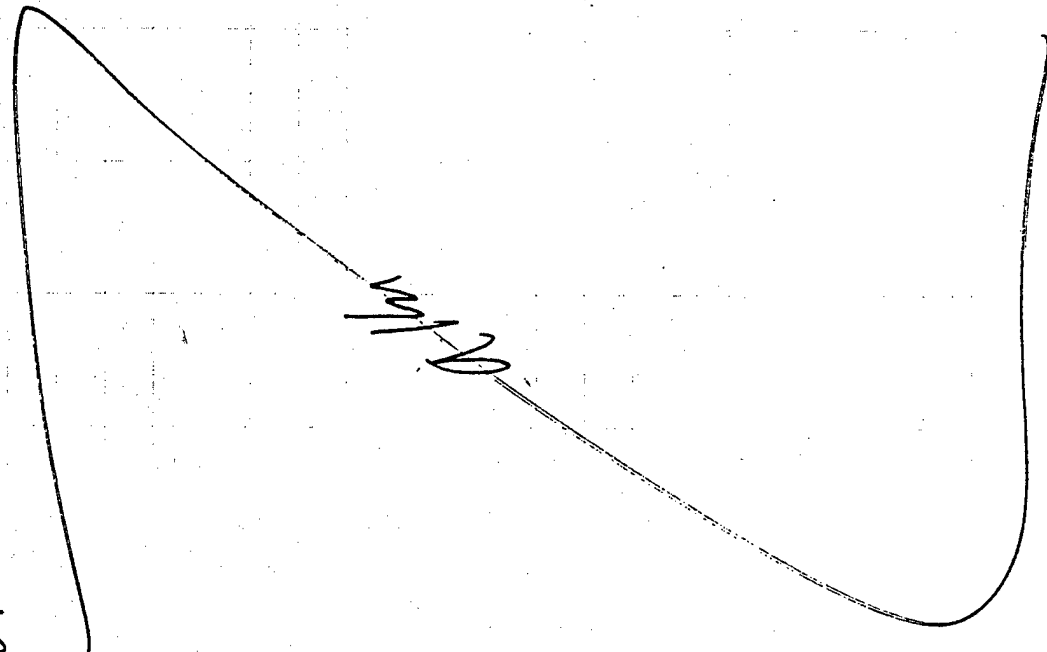
Cull terrain  
rig) and clean  
other rig

1030- Return to Hotel  
1100

END OF DAY

2/1 km

W. K. W.



10 May 95

0545 Met lobby, breakfast,  
 planning meeting  
 0630 Arrive on base  
 -0730 set up at site 25-  
 025-001 MW  
 0735- Measure w/ at 021-004 MW  
 0740 w/ = ~~6.5'~~ 11.68' BTDC

0745 Drillers arrive -  
 [025-001 MW]  
 0810 H&S meeting  
 0820 Began drilling  
 0950 Drilled to 27', hit  
 water ~ 22' BLS  
 0955 w/ = 23.8' BLS  
 1000 w/ = 23.5 BLS  
 1010 w/ = 23.2 BLS  
 1020 w/ = 23.2 BLS  
 110 Drilled to 35'  
 1100 w/ = 35' 32.5'  
 Drilled to 45' BLS  
 hit bedrock ~ 328'  
 according to rig  
 Response

J. M.

9 km

37  
025-001 MW  
LUNCH  
wl = 34.65' BLS

Hand-drawn diagram of a borehole log showing various geological layers and measurements. The log is a vertical cylinder with a wavy line representing the borehole wall. Labels and measurements include:

- borehole** (top label)
- 3 risers 40 2" sch 40** (left side, top section)
- Red Flint 45/55 sand 6 bags** (right side, top section)
- 0.110 PVC 40 2"** (right side, middle section)
- Screen** (right side, middle section)
- wheeler Johnson** (right side, middle section)
- 7.3"** (right side, bottom section)
- TD = 31.8"** (bottom right)
- Bottom screen = 29.4"** (left side, bottom section)
- Top sand = 27.1"** (left side, bottom section)
- Sherry = 22.4"** (left side, bottom section)
- Top bentonite slurry** (left side, bottom section)
- Flush mount** (left side, bottom section)
- A. K. M.** (signature at bottom right)

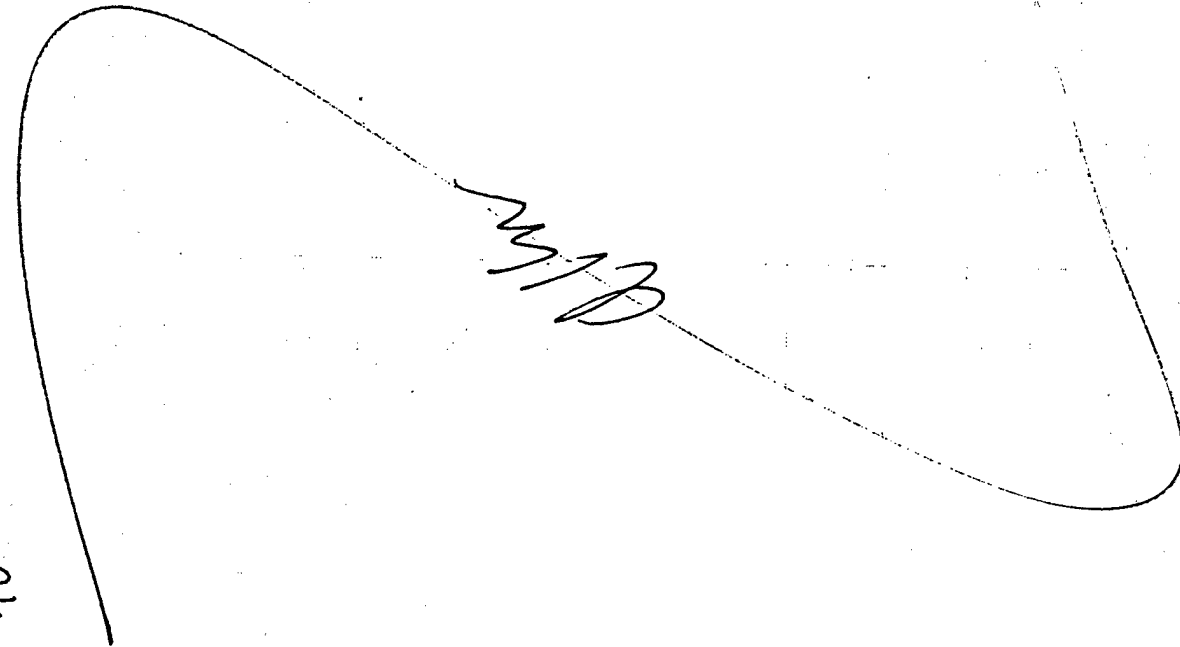
Alum

1235	Screen & riser pipe inserted
2250	Sand tremied down borehole (tremie pipe decom w/ steam cleaner)
1406	Sand at 27.4' BLS
1435	Slurries at 22.5' BLS
1500	Removing final auger
1530	Bottom of screen = 39.4' BLS
1535	Drillers start decom flights & truck
1600	Set up over
1605	(025-002 MW)
1612	Begin drilling
1620	<del>0.5-2.5 sample @</del>
1630	0.5-2.5 collected
1635	5-7 collected
	10-12 "
	15-17 "

Alum



40



Alm

41

10 May 95

1645-

1715

1720-

1600

Loaded supplies  
in Bldg 247

Arrived at Site 26  
to meet JB. who has  
been developing site  
26 monitor wells

Returned to hotel

247-716

247-716

42

43

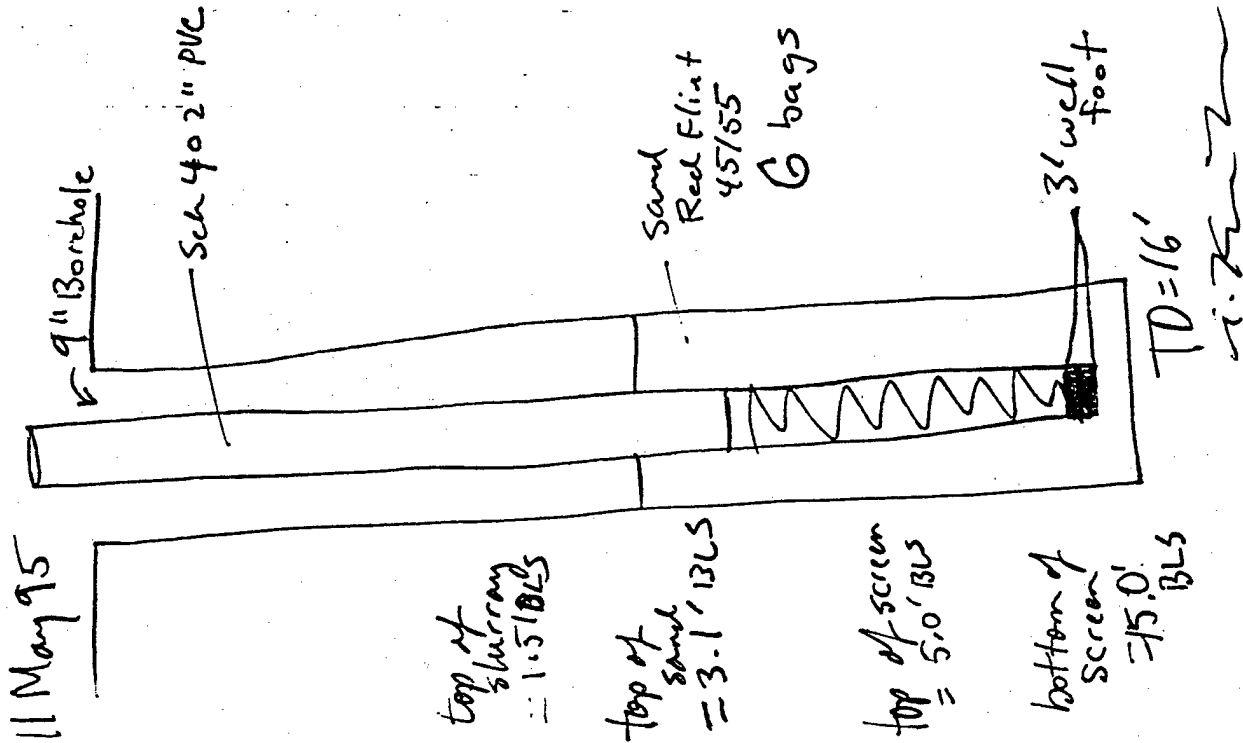
11 MAY 95 Weather: sunny 40-65°F  
 0545 Met Hotel, bank-  
 fast, planning meeting  
 0645- Arrive on base, set  
 0720 up for drilling at  
 location near BDDG  
 2nd 7 (South of)  
 Drillers arrive at  
 Site 25. HES meeting  
 0745 Wl at 025-002 MW  
 Wl = 6.0' BLS  
 Wl at 025-012 PM  
 Wl = 7.11' BTDC  
 TOC  $\approx$  2.2' above LS  
 Wl  $\approx$  5.89' BLS  
 TD = 16.90' BTDC  
 0755 025-002 MW  
 - Drillers advanced augers  
 to 45' BLS  
 16.0'  
 0815 Began well constr.  
 10' Sch 40 PVC Screen  
 Wheelabrator Johnson  
 0820- Driller's steam cleaned  
 0835 Tremie pipe

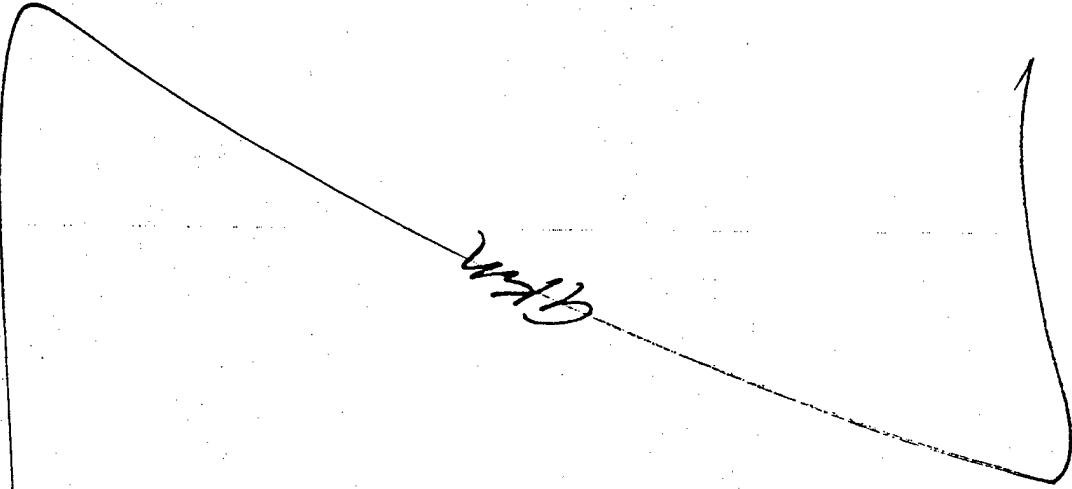
A. K. M.

44

AKM

45





11 MAY 95

0840

0922

0950

1050

1115-

1230

1230

1300

1310

1345

Began treming sand  
down borehole

Top static sand =  
3.1' BLS

Bottom of screen =  
15.0' BLS

Began preparing  
concrete

Installed riser pipe  
and guard posts  
LUNCH

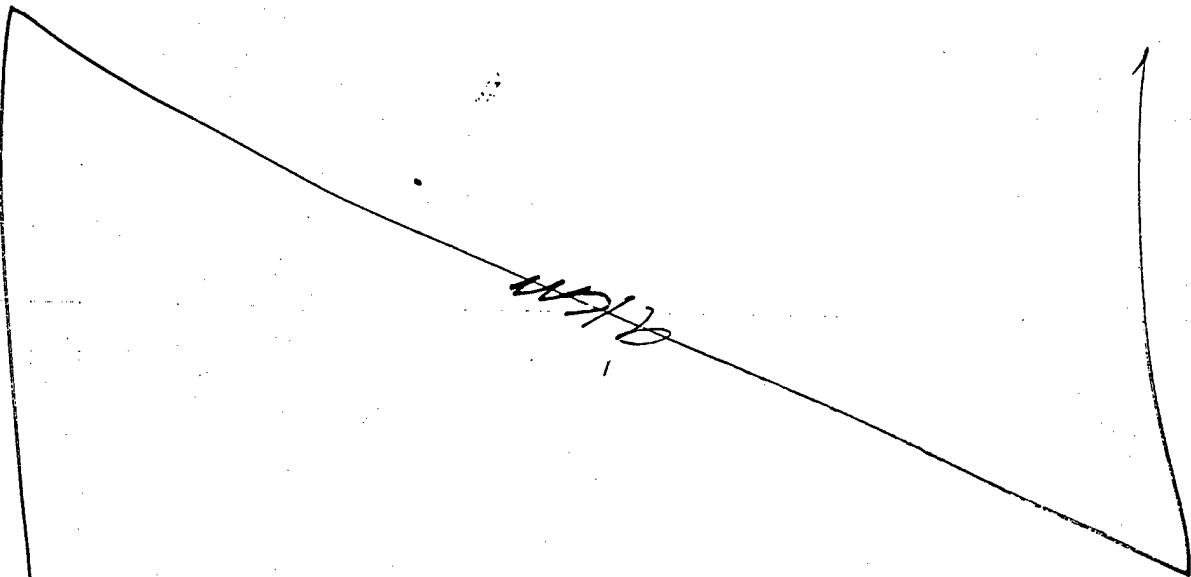
Drillers begin decon  
of riggers & truck  
Finish decon

Set up over  
025-003 MW, stabilizing  
rig on hill.

Moved hole over  
~50' north to a  
more stable location  
Began preparing for  
drilling.

A. K. M.

48



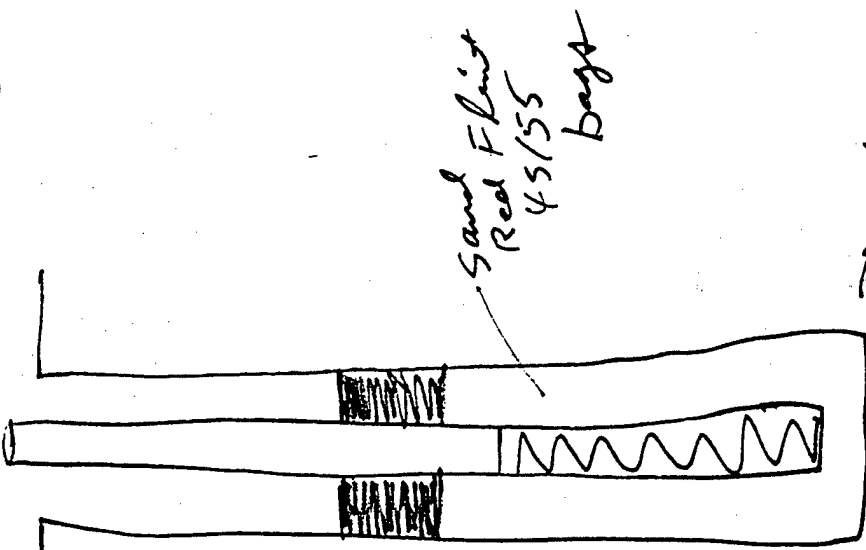
1400  
1415  
1420  
1425  
1435  
1440

alt = 4.0  
Top of sand = 7.6'  
Top of seal = 9.7

Top of screen = 9.7

bottom of screen = 12.7

025-003MW 49  
collected 0.2-2.5'  
" " 5-7'  
" " 8-10'  
" " 15-17'  
" " 20-22'  
wl = 12.7' BLS



TD = 21'

50

OKM

51

1450 Drillers begin well constr.  
 1500 Drillers begin sand treining  
 1510 PID = 40 ppm at top bk  
 Borehole opening  
 PID = 6.0 ppm  
 Breathing zone  
 PID = 0.0 ppm  
 Borehole opening  
 PID = 8.3 ppm  
 1520  
 1530 Top of sand = 7.6'  
 1540 Bottom of screen = 19.7'  
 1550 Top of bentonite = 5.5'  
 1554 " " = 4.0'  
 1615- Finish loading supplies  
 1625 in BUDG 247. Drillers  
 install rig riser casing  
 Drillers leave site  
 1630 Leave for hotel

END OF DAY  
 9-22-77

12 MAY 95

Weather sunny,  
warm 80-70°F  
Met hotel lobby,  
breakfast, planning  
meeting

0545

0630  
0635

Arrive at base  
Set up at Site

~~0730~~

25. Drillers completing  
guard post and  
surface completion  
of 001-002 wells  
Drillers begin decon  
of rig & flights  
Finish decon mob  
to 075-0088H

0930

1000

1020

sample @ 0.5-2.5 screen  
ing only

1027

sample @ 5-7 - no recovery

1035

sample @ 7-9 screen only

1046

sample @ 9-11 lab + screen

1100

sample @ 13-15 lab + screen

.6" Borehole diameter

.2 1/4" casing

1125

Broke down for lunch

1240 Return to site prepare for 025-011 BH  
 1250 Sample @ 0.5-2.5 lab  
 1300 Sample @ 5-7 lab  
 1320 Moved to 025-010 BH  
 1330 Sample @ 0.5-2.5 no rec.  
 1340 Sample @ 5-7 (lab)  
 1345 Sample @ 0.5-2.5 (lab)  
 1400 moved to 025-007 BH  
 1415 Begin drilling on 025-007 BH  
 1420 Sample @ 0.5-2.5 lab  
 1430 Sample @ 5-7 lab  
 1435 Sample @ 11-5-12 (marked)  
 (1440) Dup sample @ 11-11.5 (marked)  
 Sample @ 11-11.5 (marked)  
 MS/MSD sample @ 11-11.5 (marked)  
 1450 Sample @ 11-11.5 (marked)  
 1455 Sample @ 11-11.5 (marked)  
 1500 MS/MSD sample @ 11-11.5 (marked)  
 1505 14.5-15.0  
 1510 Begin drilling 025-006 BH  
 1520 Sample @ 0.5-2.5 no lab  
 1535 Sample @ 5-7 no lab  
 1545 " 10-12 no lab  
 1550 " 18-20 no recovery  
 " 20-22 lab  
 All augers

A. J. M.



12 MAY 95

1600

Sampler to lab:

- 025-008 BM 10.5-11'
- 025-008 BM 14.5-15'
- 025-008 BM 2.0-2.5'
- 025-010 BM 6-6.5'
- 025-011 BM 5.5-7.0 20-2.5'
- ~~• 025-001 BM 6.5-7'~~
- 025-011 BM 6.5-7'
- 025-006 BM 2.5-2.2'
- 025-009 BM 11-12
- 025-009 BM 10-12 (DWP)
- 025-009 BM 14.0-14.5
- 025-009 BM 14.5-15 MS/MSD

Equip blank:

3 VOC 8240

1 Lab 8270

1 Plus Metals

Prepared equip blank  
(025-001 RB)

1625

1630

1730

1810

Load sample cooler  
& ship to Fed Ex  
Arrived at hotel

A. K. R.

A111

15 MAY 95

0545 Meet lobby, breakfast  
& planning meeting

0630

Arrive at base

0635

Go to store for supplies

0645-

Prepare site 25 for

7308015

drilling. Drillers obtaining

water.

0930

H-Health &amp; Safety

meeting

0935

Set up over drill rig

on 025-003 BH

0948

sample @ 5-2.5

0952

" " 5-7

1000

sample @ 11.5-12 (11-12)

1000 <sup>marked</sup> (1005)

" " 11.0-11.5 (10-11)

1032

" " 16.5-17 (16-17)

1032 (1040)

" " 16.0-16.5 (16-17)

1040

" " 20-22

1052

" " 23-25 <sup>no</sup> recovery~~TD = 25' on 025-003BH~~  
Allen

J. Miller

15 May 95 Sunny, cool, breezy 90-60°F.

~~03-003 BH~~ drilled to 27' <sup>all</sup> screen only  
~~TD = 27.5~~

1105

sample at ~~25.25~~ <sup>all</sup> screen only  
 24-25

(24-25' sample represented  
 slough from 24-25)

TD = 25' on 025-003 BH

1120

Decon site for next  
 hole, drillers grouting  
 025-003 BH.

1220

Return from lunch

and setting over

(025-002 BH)

1245

sample @ 5-25

1250

5-7

1305

10-12

1310

LEL = 12

PID at brown 420ppm

stopped drilling

K.P. calling office

1320

borehole opening = 12.4ppm

1325

" " = 11ppm

LEL = 0

Wm

15 MAY 95

1430

1500

1542

1600 -

1740

1750

1630

Moved to 025-09(BH)

Sample @ 15-2-5

1, 5-7

LEL = 11, shut  
down core hole

Began cleaning up  
site and selecting  
samples to send to  
lab. Pack cooler.

Dropped samples  
at Fed Ex

Stopped for supplies  
Arrived at hotel  
END OF DAY

1630

1630

1630

16 May 95  
0545

0630  
0645  
0800

820

0827  
0835  
0840  
0850

0900  
0935  
0940  
0950  
1001  
1015

1020  
1025-  
1110

Met hotel, breakfast  
Planning meeting  
Left for base and  
arrived at base  
Set up for side  
and H & S briefing  
collected 5-2.5  
at 025-007B14

sample 6 5-7 LAB<sup>11</sup><sub>12</sub>  
" 10-12  
" 15-17  
" 20-22

TD = 22'

Moved to 025-005 B14

sample 0 0.5-2.5  
" 5-7 No rec.  
" 10-12 LAB<sup>11</sup><sub>12</sub>  
" 18-20 No rec.  
" 20-22

TD = 22'

Driller's remove auger  
Driller's decom auger

A. K.

1115  
1125  
1135  
1140  
1150  
1200  
1300-  
1330  
1355  
1400  
1405  
1415  
1430-  
1435  
1440  
1450  
1458

1510  
1525  
+53 sec  
1535

TD=61

Setup at 025-004 BH

Sample @ 5-2.5

" 5-7

" 10-12 LAB 11.5-

" 18-20 LAB 11.5-

UUPH

Set up at site 21

Setup 21-026 BH

Sample @ 5-2.5 <sup>no</sup> recover

" 4-6

" 8-10 LAB 9.0-

" 5-2.5 LAB 2.0-

Move to 21-027 BH

Sample @ 5-2.5

" 4-6 LAB 6.0

" 8-10 LAB

Sample 9.5-10 9-10 <sup>marked</sup>

Sample 7.0-9.5 8-9 <sup>marked</sup>

Move to 026-028 BH

Sample @ 5-2.5

LAB 2.0-2.5 11.5-12.0

Sample @ 8-10 4-6

LAB 5.5-6.0

A. J. K.

16 May 95  
1400-0031  
1800/

Packed sample cooler,  
unloaded supplies,  
took equip blanks,  
shipped samples  
from Site 25 at  
Feed EX and  
dropped Site 21  
Sample @ Lake  
Superior Lab  
END OF DATA

24/10

24/10

A. Kuntz

17 May 95

0545

0615

0630

0730

0730

0815

0830

0835

0837

0842

0850

0900

0905

0910

0928

0935

0940

gunny, cool 35-60

Plot Abby, D.G. &

K.M. to site

Set up at site

25

Drillers set up

and decon

Health & Safety

Meeting

Set up 025-012 MW

sample @ 5-2.5

11 5-7 LAB 6.5-7.0

11 10-12 LAB 11.5-12

11 18-20 LAB 19.5-20

Moved to 025-013 BM

Driller decon drill in

liquorbox tub and

hose w/ deionized

water, this procedure

has been followed

throughout this S.I.

sample @ 5-2.5

11 5-7

Check G.C. results for

025-MW-1 (clean) MW-2 (clean)

025-003 MW (dirty)



17 May 95

K.P. & C.W. collected drums

1005 sample @ 10-12 11.5-12.1 AB

1015 " 13-20

1030- broke down site

1330 setup at site 17,

Lu NHC

1333 sample @ 1.5-2.5 1.5-2 LAB

1340 " 4-6 5-5.5 LAB

1345 " 8-10 10.5-6

from 017-024 BH

Moved to 017-025 BH

1400 sample @ 5-2.5 1.5-2.5 LAB

1405 " 4-6 5-5.5 LAB

Moved to 017-022 BH

1410 sample @ 1.5-2.5 2-2.5 LAB

1425 " 4-6 No LAB

Moved to 017-023 BH

1450 sample @ 1.5-2.5 1.5-2 LAB

1455 " 4-6 5-5.5 LAB

Moved to 017-028 BH

1500 sample @ 1.5-2.5 1.5-2 LAB

1535 " 4-6 5-5.5 LAB

1545 " 4-6 5-5.5 LAB

A. K. M

17 May 95  
1600 L  
1845

Pack coolers, clean-  
up site, went  
to Fed Ex to  
drop off samples  
return to Site 17.  
Packed supplies  
Return to  
Hostel  
END OF DAY

1845

U. K. K. K.

18 May Weather: sunny warm h. 75!  
0545 Met in lobby, breakfast

0630 Planning meeting  
Rounded base area

Prepared for sampling  
and ~~about~~ slug

Resting.

0745- Went to hardware  
0815- store for supplies.

0830 Called Mike Superior  
Lab. Tim will send

GEO results over, and  
DRO will come later

Results from yesterday  
are to be fax tonight

0835 K.P. calling office

0915 Finish packing  
supplies and preparing  
sample bottles.

1000 Packed down  
drillers to obtain  
sample monitor well

keys for sampling

A. K. M.

A. K. M.

1015

Started slug test  
for 02500 MW  
Stopped test  
Obtained lunch and  
bought supplies  
Started test for  
025-003 MW  
Stopped test  
Left base  
Arrived back at  
hotel  
END OF DAY

1337

1545-

1515

1530

1800

1830

1900

Alma

~~11A~~

11.7a 2

Weather

19 May 95 Sunny, warm, 70°F ☺

0643 Arrive at base and

load supplies

Move to Site 17 and

prepare for drilling

Set up core (017-318H)

Sample @ 5-2.5 Polat

" 4-6 (5.5-6  
5-5.5)

" 5-2.5 no lab

" 5-2.5 (2-2.5  
3-3.2)

Move to 017-021 BH

Sample @ 5-2.5 (2-2.5  
1-5-2)

" 4-6 (5.5-6  
5-5.5)

Move to 017-032 BH

Sample @ 5-2.5 (2-2.5  
1-5-2)

Move to 017-030 BH

Sample @ 5-2.5 (2-2.5  
1-5-2)

" 4-6 (4.5-5.5  
5-5.5)

Move to 017-029 BH

Sample @ 5-2.5 (no recovery)

4-6 qm

Sample @ 5-2.5 (2-2.5  
1-5-2)

Alpha

0715-

0800

0835

0845

0858

0901

0910

0920

0925

0945

1000<sup>14</sup>

1000

1015

1020

1032

19 May 95  
1100-1200 <sup>AM</sup>  
~~1200-1345~~  
1500  
1500-1800

LUNH  
Slug Test  
025-002MW  
Pack supplies  
and samples  
decon slug  
equipment  
Drop samples  
at Fed Ex  
Flight cancelled  
return to Radisson  
Motel

1800-1830

1830-  
1900

WALD

A. K. M.

20 May 95  
900

Flight leaving

for SA

Arrive at SA

01643

W

W

W

800-937-6MAN

3

Joe Byrd, JR.

Project Scientist

4100 NW Loop 410, #230

SAN Antonio, TX 78229

(210) 731-0000 1-800-677-8072

DULUTH 1315-197

% Capt. Stephen Wabrowetz

148 FG/LGPT, Bldg. 240

4625 Deuce, Duluth, MN 55811

(218) 723-7475

~~(218) 723-7476 (FAX)~~

Radisson Hotel - Duluth

505 W. Superior Street

DULUTH, MN 55802

(218) 727-8981



CONTACTS

FEDEX 1342-6486-1 (1-800-238-5355)  
 HAZCO 1-800-332-0435  
 AIR Products 1-800-224-2724 (75509)  
 ETS 1-800-532-7474

1-800-741-9000 / O + # / 21073100010192879

Burlington Exp. (210) 402-1212 (531944410)

Duluth Airport Authority (218) 727-2968  
 ∴ HANK STORMS

PENTANE P.O. # 5641

HAZCO  
 COMPANY 554657

①

TRAVEL DAY  
 MONDAY 1 MAY 1995

0447 Leave home  
 1440 At Duluth, Go to AUGB &  
 meet up w/ KP-KM  
 unpack stuff & go skate  
 site, 25  
 1620 Leave base  
 1700 At HAZCO & checked in

6  
 14.0  
 4.8  
 12.2

12.2 hrs

JB Byrd

2 MAY 95

(2)

Tuesday DAY 1

0708 Leave for base  
Breakfast. (0.7)

0835 ON BASE  
Meet w/ Wabrowetz & Berg  
They are in meeting for  
Goto B247 & prep for  
staking out sites.

1016 Bruce is here. Goto  
Site 26

1115 Done. Goto B252  
scope out GC Room

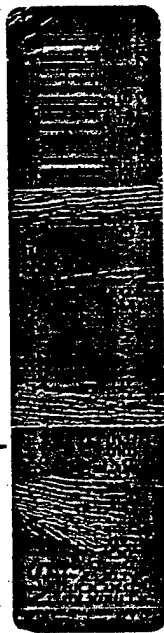
1124 Goto lunch

1224 Back on base. Haul  
stuff to GC room

1321 Goto store to get supplies

1446 Back on base

Set up GC Room



1648 Leave base  
1705 At hotel

8.3hr

*[Signature]*

7.8  
8.8  
6.1  
17.1  
8.8  
8.3

DAY 2

3

WEDNESDAY 3 MAY 1995

0515 Leave Hotel

BREAKFAST (0.7)

0645 ON BASE

Get-up GC.

BUILD 10PPM, 1PPM, & 100 PPM

BTEX STDs.

0801 100 PPM BTEX. Printer not printing

~~SET LIBRARY I3~~

5.7  
0.7  
6.4

~~--- JB ---~~

GAIN

1,000

CARRIER GAS FLOW

12  $\mu$ l/min

INJECTION VOL

100  $\mu$ l

GC OVEN TEMP

40°C

ANALYSIS TIME

500 sec

~~CALL ON I3~~

CALL M. ALEXANDER.

0836 SHUT DOWN GC & REPROGRAM

to TRY & UNLOCK PRINTER.

0955 TALK to C. HAYWARD. PRINTER

IS TOTALLY OUT. M. ESCOBAR

IS SENDING me A new one.

Prep. Printer for shipment

BACK TO OPTech

JB

3 MAY 95

(4)

1020 Goto FEDEX to ship  
Printer.  
1040 BACK FROM FEDEX  
waiting  
1130 Goto Site 26.  
1147 Begin setup AT Site 26  
1616 Leave Site 26  
1621 AT 0252. Play in PIDS  
1630 AT 0247.  
UNLOAD CARS. Prep For  
TOMORROW.  
1650 TAKE EQUIPMENT BLANK.  
Goto store to get 100.  
1730 KP-KM Goto FEDEX.  
1734 LEAVE BASU  
1754 AT Hotel

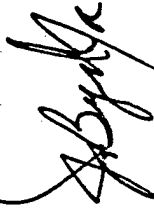
17.9  
6.4  

---

11.5



11.5



DAY 3

5

THURSDAY

4 MAY 1995

- 0545 Leave hotel  
Break Fast (0.7)  
0645 On Base  
Pack vehicles for day  
0710 Calibrate both PIDs to  
100 ppm w/ Isobutylene  
0757 Go to Fire Dept. to get  
water.  
0715 Drillers decom Augers  
0841 Go to Site 26  
0851 Health & Safety Mtg  
• JB, DG, KM, Jamie, Jonathan  
KP Mci.  
• Emergency #  
• Drillers phone  
• Jet Blast  
• Tripping HAZARD  
0855 Set-up for drilling  
Drilling  
1049 Leave Site 26. Go get  
Printer & cal gas  
Go to B252 & set up  
GC

*J. B. Mci.*

4 MAY 95

⑥

Build 10 PPM, 1 PPM, 100 PPB  
BTEx STD's.

GAIN

1,000  
12  $\mu$ l/min  
100  $\mu$ l

CARRIER GAS FLOW

INJECTION VOL.

GC OVEN TEMP

40°C

ANALYSIS TIME

500 sec

1155 100 PPB BTEx STD.

Good Run. Set LIBRARY

1214 1 PPM BTEx STD

Good Run. Set LIBRARY.

1230 10 PPM BTEx STD.

Good Run. Set LIBRARY.

1246 AIR BLANK

● Benzene 10 ppb

● Toluene 4 ppb

● E-Benzene 8 ppb

● m,p-Xylene 14 ppb

● o-Xylene 9 ppb

1257 026-004 DH 0.5-2.5' 10 g

● Benzene 11 ppb

● Toluene 4 ppb

● E-Benzene 5 ppb

● m,p-Xylene 9 ppb

FB

4 MAY 95

7

1310 026-004 BH 5'-7' 10g  
● O-Xylene 4 ppb  
● BENZENE 7 ppb  
● Toluene 3 ppb  
● E-BENZENE 2 ppb  
● M-P-Xylene 5 ppb  
● O-Xylene 2 ppb  
1322 026-004 BH 8'-10' 10g  
● BENZENE 1 ppb  
● Toluene 2 ppb  
● E-BENZENE 2 ppb  
● M-P-Xylene 4 ppb  
● O-Xylene 3 ppb  
1334 026-001 BH 0.5'-2.5' 10g  
● BENZENE 7 ppb  
● Toluene 1 ppb  
● E-BENZENE 3 ppb  
● M-P-Xylene 17 ppb  
● O-Xylene 26 ppb  
1346 026-001 BH 5'-7' 10g  
● Toluene 2 ppb

*J. B. [Signature]*

14 MAY 95

(8)

1358 100 PPB STX STD

	CAL
Benzene	100 ppb
Toluene	102 ppb
E-Benzene	101 ppb
MP-Xylene	211 ppb
O-Xylene	105 ppb
- - - - -	B - 3 - B - J - B

1410 AIR BLANK

● Toluene 1 ppb  
1422 026-004 05'-2.5' 10g Reshot  
● Toluene 2 ppb  
● E-Benzene 1 ppb  
● MP-Xylene 14 ppb  
● O-Xylene 11 ppb  
4 1334 026-001 BH 8'-10 10g

● Toluene 2 ppb  
● E-Benzene 2 ppb  
● MP-Xylene 11 ppb  
● O-Xylene 5 ppb  
1446 026-005 BH 10'-15' 10g  
13-1446 ● Toluene 2 ppb  
● MP-Xylene 5 ppb  
● O-Xylene 3 ppb

J. B. Byrd



4 MAY 95

9

1458 026-005BH 6'-6.5' 10g

- Toluene 2ppb
- E-Benzene 2ppb
- MP-Xylene 5ppb

1510 026-005BH 10.0' 10g

- Toluene 1ppb
- MP-Xylene 2ppb
- O-Xylene 1ppb

1522 100 PPB BTEX STD

CAL

Benzene	93	ppb	100	ppb
Toluene	89	ppb	100	ppb
E-Benzene	83	ppb	100	ppb
MP-Xylene	171	ppb	200	ppb
O-Xylene	95	ppb	100	ppb

1538 AIR BLANK

- E-Benzene 1ppb

1556 026-006BH 0.5'-2.5' 10g

- Benzene 7ppb
- Toluene 2ppb
- E-Benzene 2ppb
- MP-Xylene 4ppb
- O-Xylene 4ppb

*Handwritten signature*

4 MAY 95

10

1615 026-006BH 6.0'-6.5' 10g  
 • Toluene 1 ppb  
 • MP-Xylene 3 ppb  
 1627 026-006BH 11.0'-11.5' 10g  
 • Benzene 5 ppb  
 • Toluene 2 ppb  
 • MP-Xylene 4 ppb  
 • O-Xylene 2 ppb  
 1639 026-002BH 0.5'-2.5' 10g  
 • Toluene 2 ppb  
 • E-Benzene 1 ppb  
 • MP-Xylene 2 ppb  
 1651 026-002BH 5'-7' 10g  
 • Toluene 1 ppb

	CAV
1704 100 PPA BTEX STD	
Benzene	90 ppb
Toluene	81 ppb
E-Benzene	81 ppb
MP-Xylene	159 ppb
O-Xylene	73 ppb
	100 ppb
	100 ppb
	100 ppb
	200 ppb
	100 ppb

1719 AIR BLANK  
 • E-Benzene 1 ppb

*gBjgkfr*

②

● Toluene      2.96

1. 106

808

211

1109

2006

11  
4006

1756 100 PPB BT-EX

benzene	109	ppb
toluene	96	ppb
EBENE	95	ppb
mp-xylene	181	ppb
o-xylylene	88	ppb

1809 Begin GC shut-down

Secare 2528

Secure 0247

1829 leave Base

1848 At Hotel 72701

12.4 hr

$$\begin{array}{r} 18.8 \\ 6.4 \\ \hline 12.4 \end{array}$$

DAY 4

(12)

FRIDAY 5 MAY 95

0545 Leave hotel  
Breakfast (0.6)

0643 ON BASE

Go to B252 & calibrate  
PIDs

Load vehicles to go to  
Site 26.

0715 Waiting for drillers.

0745 Go to Site 26. Set up

0810 Safety mtg.

JJ, DG, KP, KM, Jamie, Jonathan

• Besafe

• Cold

• Jet blast.

0815 Start drilling MW-026-001

1015 Go to B252

1020 At B252. Perform GC maint.

Build 10ppm, 1 ppm, 100 PPB

BTX STDs. Program GC

GAIN

CARRIER Gas Flow 12  $\mu$ l/min

Injection Vol 100  $\mu$ l

GC Oven Temp 40°

5.7  
- 0.6  
6.3

5 MAY 95

(13)

ANALYSIS TIME 440 sec

1133 100 PPB BTEx STD

Good Run. Set Library.

Screw-up on Library entry

1201 100 PPB BTEx STD

Good Run. Set Library.

1222 1 PPM BTEx STD

Good Run. Set Library.

1238 10 PPM BTEx STD

Good Run. Set Library

1302 1 PPM BTEx STD.

--- Recorded m,p-xylene at

~~1313~~ 1 PPM in Cal. Run. Reshot  
& reenter in Library

1317 AIR BLANK

• Benzene

4 ppb

• Toluene

4 ppb

• E-Benzene

6 ppb

• m,p-xylene

13 ppb

1328 026-001 MW

1.0-2.0' 10g

• Toluene

3 ppb

1339 026-001 MW

5'-7' 10g

• Benzene

4 ppb

• Toluene

3 ppb

*Handwritten signature*

5 MAY 95

19

GL PROCEDURES

● E-BENZENE 3 ppb  
 ● MP-XYLENE 13 6 ppb  
 1350 026-001 MW 10'-12' 10 g  
 ● BENZENE 3 ppb  
 ● TOLUENE 3 ppb  
 ● E-BENZENE 2 ppb  
 ● MP-XYLENE 6 ppb  
 ● O-XYLENE 5 ppb  
 1401 026-001 MW 12.5'-14.5' 10 g  
 ● BENZENE 3 ppb  
 ● TOLUENE 3 ppb  
 ● E-BENZENE 3 ppb  
 ● MP-XYLENE 9 ppb  
 ● O-XYLENE 8 ppb  
 1412 026-001 MW 15'-17' 10 g  
 ● E-BENZENE 6 ppb  
 ● MP-XYLENE 13 ppb  
 1423 100 PPB BTX 57-D

	CAV
BENZENE	100 ppb
TOLUENE	96 ppb
E-BENZENE	106 ppb
MP-XYLENE	216 ppb
O-XYLENE	115 ppb

J. Byrd

5 MAY 95

(15)

1435 AIR BLANK

● Toluene 1 ppb

1445 026-001 MW 20'-22' 10g

● Toluene 2 ppb

● E-Benzene 1 ppb

● MP-Xylene 4 ppb

1456 026-001 MW 24'-26' 10g

● Toluene 2 ppb

● E-Benzene 1 ppb

● MP-Xylene 3 ppb

WAITING ON MORE SAMPLES.

1525 KP is here. There are no

more samples for today.

~~start down G-53~~

1536 100 PPB BTEX STD

● Benzene 84 ppb

● Toluene 90 ppb

● E-Benzene 102 ppb

● MP-Xylene 215 ppb

● O-Xylene 174 ppb

1548 SHUT DOWN GC.

Go to B247 to Aide in

Setup for tomorrow

*Thyph*

5 MAY 95

16

1615 Leave base. Go to store to  
get supplies  
1641 At hotel

10.4 hr

JBK

16.7  
6.3  
10.4





DAY 5

17

SATURDAY 6 MAY 95

0545 Leave hotel

Breakfast (0.6)

0640 On base

Load vehicles for field

0650 CALIBRATE BOTH PIDS to

100 PPM ISOBUTYLENE

0718 Go to site 26

0721 Set up. for drilling

Waiting on drillers

0748 Drillers here.

0808 Safety Meeting

SB, DG, KP, KM, Jamie, Wolf

• Trapping

• Don't eat dirt

• Rt. to hospital.

0810 Drilling start

1105 Leave Site 26. Go to B252

1110 At B252.

Begin GC Set-up.

Build 10 PPM ATCK STD.

1200 Rig is disconnected. Ready to back

to site 26.

J. Byrnie

6 MAY 95

(18)

1211 AT 5.42 26.

Get ready to drill LAST MW

1345 60% B252. Continue

GIC Setup & STD

Building 100 PPM & 1 PPM

GAIN

1000

CARRIER GAS FLOW

12  $\mu$ l/min

INJECTION VOL

100  $\mu$ l

GC OVEN TEMP

40°C

ANALYSIS TIME

450 sec

1404 100 PPM BTEX STD

Good Run. Set LIBRARY

1422 1 PPM BTEX STD

1425 60% Front Gate to hand-off

Geo-Tech samples

1430 samples are handed off

1435 Back at B252.

Good Run. Set LIBRARY.

1441 10 PPM BTEX STD.

Good Run. Set LIBRARY

1456 AIR BLANK

● BENZENE

4 ppb

● TOLUENE

3 ppb

● E-BENZENE

8 ppb

*J. Byrd*

6 MAY 95

(19)

1507	MP-Xylene	21 ppb	10g
	026-003MW	0.5'-2.5'	
	Benzene	5 ppb	
	Toluene	4 ppb	
	E-Benzene	6 ppb	
	MP-Xylene	26 ppb	
	O-Xylene	5 ppb	
1518	026-003MW	5'-7'	10g
	Benzene	3 ppb	
	Toluene	3 ppb	
	E-Benzene	10 ppb	
	MP-Xylene	25 ppb	
	O-Xylene	27 ppb	
1529	026-003MW	10'-12'	10g
	Benzene	3 ppb	
	Toluene	3 ppb	
	E-Benzene	11 ppb	
	MP-Xylene	32 ppb	
	O-Xylene	28 ppb	
1540	026-002MW	0.5'-2.5'	10g
	Toluene	3 ppb	
	E-Benzene	12 ppb	
	MP-Xylene	31 ppb	
	O-Xylene	32 ppb	

*gdp/kr*

6 MAY 1995

(20)

1551 026-002MW 5'-7' 10g  
● Toluene 2ppb  
● E-Benzene 3ppb  
● MP-Xylene 15ppb  
● O-Xylene 17ppb

1602 100 PPB BTEX STD	CAL
BENZENE 100 ppb	100 ppb
TOLUENE 90 ppb	100 ppb
E-BENZENE 86 ppb	100 ppb
MP-XYLENE 169 ppb	200 ppb
O-XYLENE 78 ppb	100 ppb

1616 AIR BLANK  
● Toluene 1ppb

1627 026-002MW 10'-12' 10g  
● Benzene 1ppb  
● Toluene 3ppb  
● E-Benzene 3ppb  
● MP-Xylene 9ppb  
● O-Xylene 7ppb

1638 026-002MW 15'-17' 10g  
● Benzene 3ppb  
● Toluene 3ppb

*J. B. J.*

6 MAY 95

(21)

● ET-BENZENE

● MP-XYLENE

● O-XYLENE

1649 100 PPB BTX STD

\* BENZENE

\* TOLUENE

\* A-BENZENE

\* MP-XYLENE

\* O-XYLENE

1659 Shut down GC.

1705 Leave base

1723 At hotel

2 ppb  
7 ppb  
4 ppb

100 ppb  
94 ppb  
91 ppb  
185 ppb  
97 ppb

17.4  
6.3  
11.1

11.1 hrs

J. Byrd Jr

DAY 7

22

MONDAY 8 MAY 1995

0545 Leave hotel  
Breakfast (0.6)

0645 ON BASE

0650 Go to B252. Calibrate  
PID to 100 ppm Iso-butane  
& LEL to 50% Pentane

-- Both PIDs were left on  
over the weekend. 100%  
no charge on either one.

0700 Check equipment, get bottle  
& brass sleeve counts.

ORGANIZE stuff.

0810 Go to B252. Set up D.G. on  
GC. He will do daily prep &  
set-up today

0815 Call SPL to order ice chests  
& bottles.

-- Talk to KAREN.

0830 Call OPTECH. Talk to M. Ecobarr  
about LAs. Get P.O.# from  
A. Kobchenko.

0850 Call Enviro. Inst. But it is  
0700 in California.

*J. Byrd*

5.7  
1.1  
6.8

8 MAY 95

(23)

0900 Monitor & Gateway as he  
Programs GC. and Builds  
10 PPM, 1 PPM, & 100 PPM  
BTEx STDs

0954 100 PPM BTEx STD.  
Missed shot.

1010 100 PPM BTEx STD.

Good Run. Set Library.

1029 1 PPM BTEx STD

Good Run. Set Library

1045 10 PPM BTEx STD.

Good Run. Set Library

1059 AIR BLANK

● Benzene

● Toluene

● Ethylbenzene

● MP-Xylene

● O-Xylene

-- unusually high readings.

1113 AIR BLANK

● Benzene

● Toluene

● E-Benzene

● MP-Xylene

12 PPM

30 PPM

79 PPM

155 PPM

76 PPM

5 PPM

16 PPM

41 PPM

92 PPM

*g. B. G. for*

18 MAY 95

(24)

● O-xylene 185 ppb.  
-- Printer malfunction. need to reprint.

1132 KP-KM-DG go to lunch.  
lunch (0.5)

1200 AIR BLANK.

● BENZENE 2 ppb  
● Toluene 8 ppb  
● E-BENZENE 7 ppb  
● MP-XYLENE 13 ppb  
● O-XYLENE 14 ppb

1213 Methanol (500ul injection) (-5)  
● BENZENE 12 ppb → 2 ppb  
● Toluene 22 ppb → 4 ppb  
● E-BENZENE 6 ppb → 1 ppb  
● MP-XYLENE 9 ppb → 2 ppb

1225 Goto B247 got. set up  
Decon stuff to clean  
brass sleeves.

1235 KP-KM-DG RETURN.

Go to B252 to continue GC.  
They have soil from this AM.

J. Byrd



25

1256	026-002 MW	20.0'-22.0'	10g
●	Benzene	4 ppb	
●	Toluene	6 ppb	
●	E-Benzene	7 ppb	
●	mP-Xylene	13 ppb	
●	O-Xylene	11 ppb	

1307 100 PPB BTX STD

Benzene	99	ppb	ppb
Toluene	80	ppb	ppb
E-BENZENE	72	ppb	ppb
MP-XYLENE	133	ppb	ppb
O-XYLENE	47	ppb	ppb

1319 Sheet down GC.

Go to 0247 & continue decon  
of brass sleeves

Set-up equipment for tomorrow.  
1500 meet w/ B. Berg.

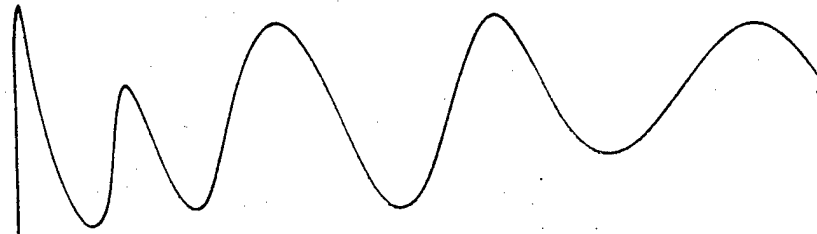
He ok's all sizes not 25-  
for tomorrow drilling  
target 025-001mw. It is  
moved 8-10' south.

*2/2/2017*

(26)

8 MAY 95

1515 KM-KP are back  
Discuss schedule.  
1530 Leave base  
1540 At Hotel



spiky 4R

9.0 hrs

$$\begin{array}{r} 15.8 \\ 6.8 \\ \hline 9.0 \end{array}$$

~~DL~~

DAY 8

(27)

TUESDAY 9 MAY 1995

0600 LEAVE hotel

Breakfast (0.7)

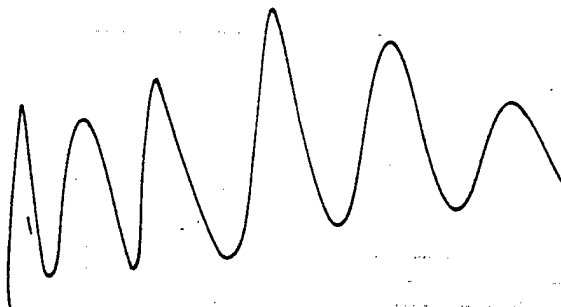
0700 ON BASE

--- Weather: 40's (low)  
RAINING HARDNO JOB RELATED ACTIVITIES  
Today due to weather

0740 LEAVE BASE

FUEL CAR.

0800 AT hotel



J. Byrd

1.3 hr.

DAY 9

(28)

WEDNESDAY

10 MAY 1995

0545 Leave hotel

BREAKFAST (0.6)

0645 On Base

0650 CALIBRATE BOTH PIDs to

100 PPM T50 battery level.

0710 Set-up on 025-001MW

Decon equipment

0730 Drilled on site

0810 Safety meeting

• JB, DG, KD, KM, Jamie, Jon

• Kill switches

• TRAFFIC AREA

• Eye, toe protection

0815 Go calibrate pH, Temp. and, L

Turbidity meter.

0850 Goto store to get batteries for

LEL

0905 Back on base. Comb. in Cal. base

0930 Gary is here. Goto Site 26.

0943 on Site. Set-up & Decon

equipment.

Set-up on 026-001MW

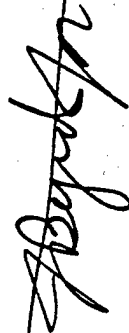
FB

5.7  
1.1  
6.8

(29)

10 MAY 95

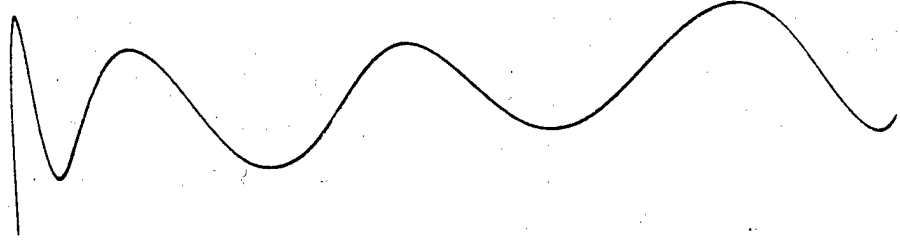
- 1205 Done w/ 026-001MW  
CALL SP For escort off  
Flight Line
- 1217 Drilling Crew @ Launch
- 1220 Leave Base for Launch (0.5)
- 1250 ON BASE.
- Meet w/ KP. We need  
to continue development of  
026-001MW for 1 more hour.
- 1305 CALL Security for escort.  
Go to Site 26.  
Continue w/ development of  
026-001MW
- 1447 2-hr time table is done. Rig  
down equipment, decon, and move  
to 026-002MW & set up.
- 1710 Done @ 026-002MW  
from developed 30 well volume  
BREAK down & move to  
026-003MW
- 1711 KP-KM-DG on Site. Will  
develop 026-003MW on Friday.
- 1748 Leave Site 26.



10 May 95

(30)

Plug in PIDs for charging  
1757 leave base  
1818 At hotel



JBryd

11.5 hrs

$$\begin{array}{r} 7' \\ 18.3 \\ 6.8 \\ \hline 11.5 \end{array}$$

JB

DAY 10

(31)

THURSDAY

11 MAY 1995

0545 Leave hotel

Breakfast (0.6)

0640 On Base

Prep truck for day.

CALIBRATE PID w/ 100

PPM Iso Butylene.

0700 START-up & Program, &

Baild 80 PPM, 1 PPM, and

100 PPB BTEX STDs.

0731 Goto Safety Mtg

SB, DG, KP, KM, JAMIE, Jonathan

• Sunscreen

• PPE

• Be safe

• Tripping.

0740 Continue GC set-up.

0754 100 PPB BTEX STD.

Good Picture. Set Library

0810 1 PPM BTEX STD

Good Run. Set Library.

0824 10 PPM BTEX STD

Good Run. Set Library

J. Synge

5.7  
1.3  
7.0

11 MAY 95

32

0837 AIR BLANK

● Benzene 8 ppb  
● Toluene 18 ppb  
● E-Benzene 22 ppb  
● MP-Xylene 51 ppb  
● O-Xylene 21 ppb

0847 025-001 MW 0.5'-2.5' 10g

● Benzene 6 ppb  
● Toluene 6 ppb  
● E-Benzene 8 ppb  
● MP-Xylene 18 ppb

0857 025-001 MW 5'-7' 10g

● Benzene 1 ppb  
● Toluene 4 ppb  
● E-Benzene 8 ppb  
● MP-Xylene 21 ppb

0907 025-001 MW 10'-12' 10g

● Benzene 2 ppb  
● Toluene 4 ppb  
● E-Benzene 13 ppb  
● MP-Xylene 19 ppb

0917 025-001 MW 15'-17' 10g

● Benzene 1 ppb  
● Toluene 4 ppb

*J. B. Blythe*



11 MAY 95

33

● E-Benzene 3 ppb  
● MP-Xylene 11 ppb  
0928 025-001 MW 20'-22' 10g  
● Benzene 1 ppb  
● Toluene 4 ppb  
● E-Benzene 3 ppb  
● MP-Xylene 8 ppb

0938 100 PPB BTEX STD

CAW

Benzene 91 ppb 100 ppb  
Toluene 87 ppb 100 ppb  
E-Benzene 89 ppb 100 ppb  
MP-Xylene 193 ppb 200 ppb  
O-Xylene 87 ppb 100 ppb

0950 AIR BLANK

● Toluene 2 ppb  
● E-Benzene 2 ppb  
1002 025-001 MW 25'-27' 10g  
● Benzene 3 ppb  
● Toluene 4 ppb  
● E-Benzene 2 ppb  
● MP-Xylene 5 ppb

*J. Byrd*

11 MAY 95

34

1012 025-001 MW 30'-32' 10g  
 ● Benzene 3 ppb  
 ● Toluene 4 ppb  
 ● E-Benzene 5 ppb  
 ● MP-Xylene 9 ppb

1022 025-001 MW 35'-37' 10g  
 ● Toluene 4 ppb  
 ● E-Benzene 18 ppb  
 ● MP-Xylene 29 ppb

1032 025-002 MW 0.5'-2.5' 10g  
 ● Toluene 4 ppb  
 ● E-Benzene 2 ppb  
 ● MP-Xylene 7 ppb

1042 025-002 MW 5'-7' 10g  
 ● Benzene 3 ppb  
 ● Toluene 4 ppb  
 ● E-Benzene 1 ppb  
 ● MP-Xylene 3 ppb

1052 100 PPB BTX STD

CAK

Benzene	108	1ppb	<del>1ppb</del>
Toluene	104	1ppb	<del>1ppb</del>
E-Benzene	104	1ppb	<del>1ppb</del>
MP-Xylene	212	1ppb	<del>1ppb</del>
O-Xylene	108	1ppb	<del>1ppb</del>

*Handwritten signature*

11 MAY 95

(35)

1108 Goto lunch (0.7)  
1151 At Site 17 too walk size  
1210 ON BASE  
1226 AIR BLANK

● Toluene 1 ppb  
● E-BENZENE 1 ppb

1241 025-002MW 10'-12' 10g

● BENZENE 4 ppb  
● Toluene 4 ppb  
● E-BENZENE 2 ppb  
● MP-Xylene 7 ppb  
● O-Xylene 4 ppb

1252 025-002MW 15'-17' 10g

● Toluene 4 ppb  
● E-BENZENE 1 ppb  
● MP-Xylene 4 ppb  
● O-Xylene 3 ppb

1305 Out of samples. Goto site 25  
to get more.

1404 BACK @ GC  
Prep. Sample

J. Rydzka

11 MAY 95

(36)

1407 100 PPB BTEX STD

		CAV
BENZENE	86 ppb	100 ppb
TOLUENE	85 ppb	100 ppb
E-BENZENE	81 ppb	100 ppb
MP-XYLENE	166 ppb	200 ppb
OP-XYLENE	83 ppb	100 ppb

1421 AIR BLANK

● Toluene	1 ppb
● MP-XYLENE	27 ppb
1431 025-003MW 0.5'-2.5'	10g

~~1431~~

● Toluene	5 ppb
● E-BENZENE	3 ppb
● MP-XYLENE	13 ppb
● OP-XYLENE	9 ppb

1441 025-003MW 5'-7'

● Benzene	10g
● Toluene	25 ppb
● E-BENZENE	4 ppb
● MP-XYLENE	2 ppb
	15 ppb

1451 025-003MW 10'-12'

● BENZENE	10g
● Toluene	774 ppb
	350 ppb

*J. B. B. B.*

11 MAY 95

(37)

- E-Benzene
- MP-Xylene
- O-Xylene

297 ppb  
1,838 ppb  
827 ppb

1511 025-003MW 10'-12'

10g (-5x)

- Benzene
- Toluene
- E-Benzene
- MP-Xylene
- O-Xylene

133 ppb  
103 ppb  
108 ppb  
443 ppb  
197 ppb

20µl

INJECT

10µl

1531 025-003MW 15'-17'

10g (-10x)

- Benzene
- Toluene
- E-Benzene
- MP-Xylene
- O-Xylene

222  
14  
ND  
ND  
ND

10µl

INJECTION

1545 1 PPM BTX STD

	CA6
Benzene	696 ppb 1,000 ppb
Toluene	679 ppb 1,000 ppb
E-Benzene	658 ppb 1,000 ppb
MP-Xylene	1,389 ppb 2,000 ppb
O-Xylene	586 ppb 1,000 ppb

*J. D. [Signature]*

11 MAY 95

38

1601 AIR BLANK

● Toluene

● E-Benzene

● MP-Xylene

1612 025-003 MW 20'-22' 10g

● Benzene

● Toluene

● E-Benzene

● MP-Xylene

● O-Xylene

1627 AIR BLANK

● Toluene

● E-Benzene

● MP-Xylene

1638 Shut down GC.

1648 Leave base

1705 AT hotel

1 ppb

1 ppb

3 ppb

10g

149 ppb

15 ppb

9 ppb

25 ppb

16 ppb

1 ppb

1 ppb

2 ppb

10.1 hr

17.1  
7.0  
10.1

*[Signature]*

*[Wavy line]*

*[Signature]*

DAY 11

(39)

FRIDAY MAY 12 1995

0545 Leave hotel

Breakfast (0.7

0645 On base

CALIBRATE PIDS & Hydac  
meter.

0710 Call security for escort to  
Site 26.

0717 On site. Set up for development  
of 026-003MW

0940 Done. Call security for  
escort. Waiting for F-16 to  
leave hanger.

0951 Off site 26. Go to B247  
to decon for development  
of 025-001MW.

1020 At 025-001 MW.

1236 Done

Decon equipment. Move to  
025-002 MW

1510 Done. Decon & Go to  
025-003MW.

1735 Done. Decon equipment

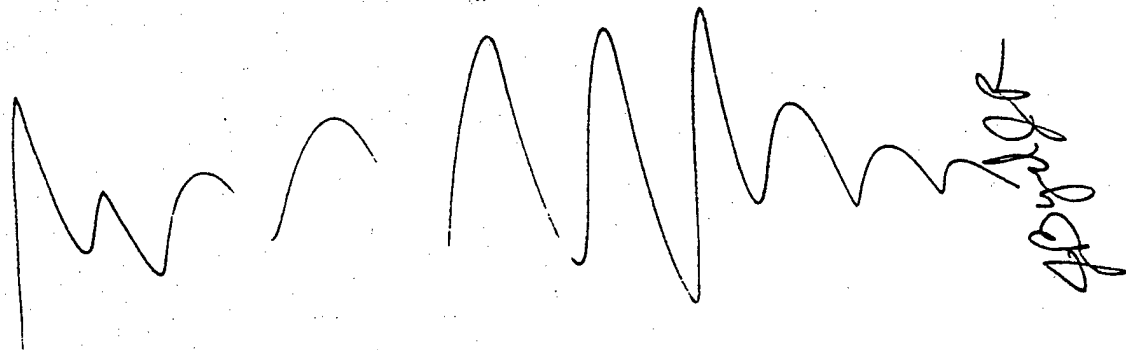
*[Signature]*

5.7  
- .7  
---  
6.4

40

12 MAY 75

1750 LEAVE BASE  
1805 AT HOTEL



11.7 hr

7.  
18.1  
6.4  
—  
11.7

*[Handwritten signature]*



DAY 12

(41)

SATURDAY 13 MAY 1995

0730 LEAVE HOTEL

BREAKFAST (0.3)

0810 ON BASE

Set-up GC. Build 10 PPM,  
1 PPM, 100 PPB BTX STDs.

GAIN

1,000

CARRIER GAS FLOW

14 ml/min

INJECTION VOL

100  $\mu$ l

GC OVEN TEMP

40°C

ANALYSIS TIME

400 sec

0848 100 PPB BTX STD

Good Run. Set Library

0904 1 PPM BTX STD

Good Run. Set Library

0918 10 PPM BTX STD.

Good Run. Set Library

0931 AIR BLANK

• Benzene

4 ppb

• Toluene

3 ppb

• E-Benzene

8 ppb

• MP-Xylene

14 ppb

0941 025-009BH 0.5'-2.5'

10 J

• Benzene

4 ppb

J. Bygones

7.5  
- .3  
7.8

(42)

13 MAY 95

● Toluene	4 ppb
● E-Benzene	4 ppb
● MP-Xylene	9 ppb
0952 025-009BH 5'-7'	10g
● Benzene	3 ppb
● Toluene	4 ppb
● E-Benzene	3 ppb
● MP-Xylene	2 ppb
1003 025-009BH 10'-12'	10g
● Benzene	3 ppb
● Toluene	3 ppb
1013 025-011BH 0.5'-2.5'	10g
● Benzene	2 ppb
● Toluene	3 ppb
● E-Benzene	1 ppb
● MP-Xylene	4 ppb
1023 025-011BH 5'-7'	10g
● Toluene	4 ppb
● E-Benzene	2 ppb
● MP-Xylene	5 ppb

JBY/gf

13 MAY 95

(43)

1033 100 PPA BTX STD

		CAL
Benzene	106	1 ppb
Toluene	100	1 ppb
E-Benzene	101	1 ppb
MP-Xylene	207	1 ppb
O-Xylene	99	1 ppb

1043 AIR BLANK

- Toluene
- MP-Xylene

1 ppb  
3 ppb  
10g  
3 ppb  
1 ppb  
3 ppb  
20g  
72 ppb  
184 ppb  
1,270 ppb  
1,290 ppb  
18,900 ppb  
20g  
7 ppb

1054 025-008BH 05'-25'

- Toluene
- E-Benzene
- MP-Xylene

1104 025-008BH 7'-9'

- Benzene
- Toluene
- E-Benzene
- MP-Xylene
- O-Xylene

1121 025-008BH 7'-9'

- 10ul injection
- Benzene

J. Byrd

13 MAY 95

(44)

- Toluene
- E-Benzene
- MP-Xylene
- O-Xylene

22 ppb  
126 ppb  
158 ppb  
806 ppb

1136 025-008BH 9'-11' 10g

--- 10 microliter injection

- ALL ND's

1147 025-008BH 9'-11' 10g

--- Reshot 50ul injection

- Benzene
- Toluene
- E-Benzene
- O-Xylene

2 ppb  
2 ppb  
6 ppb  
30 ppb

1158 100 PPB BTEX STD

	108	95	101	214	144	100	100	100	200	100
Benzene	108	95	101	214	144	100	100	100	200	100
Toluene	108	95	101	214	144	100	100	100	200	100
E-Benzene	108	95	101	214	144	100	100	100	200	100
MP-Xylene	108	95	101	214	144	100	100	100	200	100
O-Xylene	108	95	101	214	144	100	100	100	200	100

1210 AIR BLANK

- Benzene
- Toluene

1 ppb  
2 ppb

*J. B. [Signature]*

13 MAY 95

45

● E-Benzene			1 ppb
● MP-Xylene			2 ppb
1221 025-008BH	13'-15'		10g
● Toluene			3 ppb
● E-Benzene			2 ppb
1231 025-010BH	0.5'-2.5'		10g
● Toluene			3 ppb
● E-Benzene			7 ppb
● MP-Xylene			17 ppb
● O-Xylene			9 ppb
1242 025-010BH	5'-7'		10g
● Benzene			3 ppb
● Toluene			3 ppb
● E-Benzene			1 ppb
● MP-Xylene			3 ppb
● O-Xylene			2 ppb
1300 025-006BH	0.5'-2.5'		10g
● Toluene			3 ppb
● E-Benzene			1 ppb
● MP-Xylene			3 ppb
● O-Xylene			1 ppb
1310 025-006BH	5'-7'		10g
● Toluene			3 ppb
● E-Benzene			1 ppb

*Handwritten signature*

13 MAY 95

46

- MP-Xylene
- O-Xylene

3 ppb  
1 ppb

1320 100 PPB OTEX STD

	CAL
Benzene	89 ppb
Toluene	97 ppb
E-Benzene	88 ppb
MP-Xylene	159 ppb
O-Xylene	34 ppb
	100 ppb
	100 ppb
	100 ppb
	200 ppb
	100 ppb

1333 AIR BLANK

- Toluene
- MP-Xylene

12 ppb  
3 ppb

~~925~~ JB

1343 025-006BH 10'-12'

- Toluene
- E-Benzene
- O-Xylene

10g  
5 ppb  
5 ppb  
14 ppb

1353 025-006BH 20'-22'

- Benzene
- Toluene
- E-Benzene
- O-Xylene

10g  
3 ppb  
32 ppb  
35 ppb  
78 ppb

J. B. Smith

13 MAY 95

(47)

1404 100 PPB BTX STD

● Benzene

● Toluene

● E-Benzene

● MP-Xylene

● O-Xylene

93 ppb

92 ppb

96 ppb

193 ppb

101 ppb

Shut down GC.

Secure BZ52.

1420 Leave base.

1440 AT hotel

$$\begin{array}{r} 3' \\ 14.7 \\ 7.8 \\ \hline 6.9 \end{array}$$

6.9hr

J. Byrd Jr

DAY 14

4B

GC PROCEDURES.

MONDAY

15 MAY 95

0545 Leave hotel. Get GAS.

BREAKFAST (0.3)

0645 ON BASE

Set-up & Program GC.

CALIBRATE BETH PLD's TO

100 PPM Isobutylene

CALIBRATE GEL TO 50%

Pentane.

Build 10 PPM, 1 PPM, &

100 PPB BTX STD's.

5.7  
-3  
6.0



0812 100 PPB BTX STD.

Good Run. Set Library.

0839 1 PPM BTX STD.

Good Run. Set Library

0855 10 PPM BTX STD

Good Run. Set Library

0912 AIR BLANK

● Benzene

● Toluene

2 ppb  
1 ppb

J. Byrd



15 MAY 95

(49)

- E-Benzene 3 ppb
- MP-Xylene 4 ppb

0925 Go to Site to get samples.  
0930 Safety Meeting

- JB, KL, KM, DG, JAMIE, JON
- Weather - chance of rain?
- PPE

● Don't eat Diet.

0935 HAVE not begun yet. Go to Site 17 to meet w/ people to get underground clearances  
1023 Person from Gopher 1 here. He had been here earlier to check site for dailers. He is from the City of Duluth.

1045 HAVE given anybody else 30 min. Return to base.

1051 on base gather samples.  
Prep. samples

too p ~~LB~~

1103 1 PPM BTEX STD. CAL

- Benzene 827 ppb 1,000 ppb
- Toluene 778 ppb 1,000 ppb
- E-Benzene 664 ppb 1,000 ppb

J. Byrnes

$$\begin{array}{r} 10.9 \\ 9.6 \\ \hline 1.3 \end{array}$$

15 MAY 95

50

MP-Xylene 1300 ppb 2,000 ppb  
O-Xylene 632 ppb 1,000 ppb

1117 AIR BLANK

● Benzene  
● Toluene  
● E-Benzene  
● MP-Xylene

1 ppb  
2 ppb  
3 ppb  
3 ppb

1127 025-003BH 0.5'-2.5'

● Benzene  
● Toluene  
● E-Benzene  
● O-Xylene

10g  
7 ppb  
10 ppb  
41 ppb  
82 ppb

1137 025-003BH 5'-7'

● E-Benzene  
● MP-Xylene  
● O-Xylene

10g  
3,620 ppb  
35,650 ppb  
15,050 ppb

1149 025-003BH 5'-7' 10g Reshot  
--- 10ul injection

● ALL NDS

1201 025-003BH 5'-7' 10g Reshot  
--- 20ul injection

J. Byrd

15 MAY 95

51

- Toluene 4,790 ppb
- E-Benzene 747 ppb
- MP-Xylene 2,740 ppb
- O-Xylene 4,030 ppb

1215 025-003BH 10'-12' 10g

--- 20ul injection

- Toluene 9,510 ppb
- E-Benzene 1,040 ppb
- MP-Xylene 7,290 ppb
- O-Xylene 5,400 ppb

1229 10 PPM BTEX STD

CAL

Benzene	8,720 ppb	10,000 ppb
Toluene	8,470 ppb	10,000 ppb
E-Benzene	5,510 ppb	10,000 ppb
MP-Xylene	11,620 ppb	20,000 ppb
O-Xylene	5,810 ppb	10,000 ppb

1243 AIR BLANK

- Benzene 11 ppb
- Toluene 5 ppb
- E-Benzene 11 ppb
- MP-Xylene 25 ppb

JB

flydfr

15 MAY 95

52

# GC PROCEDURES

1255 025-003BH 15'-17' 10g  
--- 20  $\mu$ l injection  
● Benzene 28 ppb  
● Toluene 43 ppb  
● E-Benzene 41 ppb  
● MP-Xylene 228 ppb  
● O-Xylene 84 ppb  
1306 025-003BH 20'-22' 10g  
--- 50  $\mu$ l injection

● Benzene 138 ppb  
● Toluene 157 ppb  
● E-Benzene 123 ppb  
● MP-Xylene 916 ppb  
● O-Xylene 553 ppb

1317 GoLo Rig to get more  
Samples

1339 025-003BH 25' 10g  
--- 20  $\mu$ l injection

● ALL ND's (NO READ-OUT)  
1351 025-003BH 25' 10g Reshot  
--- 100  $\mu$ l injection

● Benzene 20 ppb  
● Toluene 276 ppb  
● E-Benzene 42 ppb

*gbygk*

GC PROCEDURES

15 MAY 95

53

● MP-Xylene 364 ppb  
 ● O-Xylene 47 ppb  
 1402 025-002BH 0.5'-2.5' 10g  
 ● Benzene 13 ppb  
 ● Toluene 152 ppb  
 ● E-BENZENE 12 ppb  
 ● MP-Xylene 31 ppb  
 1418 1 PPM BTX

	CAV
Benzene	900 ppb 1,000 ppb
Toluene	828 ppb 1,000 ppb
E-Benzene	718 ppb 1,000 ppb
MP-Xylene	1,440 ppb 2,000 ppb
O-Xylene	824 ppb 1,000 ppb

1432 AIR BLANK  
 ● Toluene 2 ppb  
 ● E-Benzene 3 ppb  
 ● MP-Xylene 6 ppb  
 1442 025-002BH 5'-7' 50ul inject 10g  
 ● SNOT messed up  
 1454 025-002BH 5'-7' 10g  
 --- 30ul injection  
 ● Benzene 1,160,000 ppb

*[Signature]*

15 MAY 95

59

- Toluene 52,510 ppb
- E-Benzene 5,100 ppb
- MP-Xylene 41,000 ppb
- O-Xylene 22,700 ppb

1505 Goto site to talk to KP  
about concentrations.

1541 025-002BH 5'-7' 10g  
--- 5ul injection

- Benzene 1,010 ppb
- Toluene 10,700 ppb
- E-Benzene 135 ppb
- MP-Xylene 7,810 ppb
- O-Xylene 5,190 ppb

1557 025-002BH 5'-7' 10g  
--- 5ul injection --- Re-Reshot

- Benzene 3,690 ppb
- Toluene 10,450 ppb
- E-Benzene 168 ppb
- MP-Xylene 7,230 ppb
- O-Xylene 4,650 ppb

1613 Goto site to get samples.  
Prep. Samples

*J. Byrd*

15 MAY 95

55

1638 10 PPM BTEX STD

	CAL
Benzene	9,050 ppb 10,000 ppb
Toluene	8,790 ppb 10,000 ppb
E-Benzene	8,290 ppb 10,000 ppb
MP-Xylene	16,840 ppb 20,000 ppb
O-Xylene	8,390 ppb 10,000 ppb

1652 AIR BLANK

- Benzene 11 ppb
- Toluene 38 ppb
- E-Benzene 41 ppb
- MP-Xylene 521 ppb
- O-Xylene 103 ppb

1702 AIR BLANK (400ul injection)

- Benzene 10 ppb
- Toluene 14 ppb
- E-Benzene 4 ppb
- MP-Xylene 13 ppb

1713 025-001 BH 05-25'

--- 50 ul injections

- Benzene 340g 3g
- Toluene 30-3 ppb 9 ppb
- E-Benzene 30-3 ppb-31 ppb 4 ppb

J. Byrd

15 MAY 95

56

● MP-Xylene 16 ppb

1723 025-001BH 5'-7' 3g

● Benzene JB

● Toluene 18,380 ppb

● E-Benzene 190 ppb

● MP-Xylene 11,620 ppb

● O-Xylene 5,410 ppb

1736 10 PPM BTEX STD

● Benzene 10,940 ppb

● Toluene 9,800 ppb

● E-Benzene 8,540 ppb

● MP-Xylene 16,560 ppb

● O-Xylene 7,750 ppb

Shut down GC.

Secure B252

1754 leave base

1816 At Hotel

18.3  
6.0  
12.3

1.3 - 213

11.0 - 197

12.3hr

*[Signature]*



DAY 15

57

TUESDAY 16 MAY 95

0545 leave hotel

Breakfast (0.6)

0845 on Base

PROGRAM GC. Build 10 PPM,  
1 PPM, & 100 PPB BTEX STDs.

100 PPB BTEX B.

GAIN

1.000

CARRIER GAS FLOW

13.400 11.3 ml/min

INJECTION VOL.

100  $\mu$ l

GC OVEN TEMP

40°C

ANALYSIS TIME

45.0

0803 100 PPB BTEX STD.

Good Run. Set Library

0820 1 PPM BTEX STD.

Good Run. Set Library

0834 10 PPM BTEX STD

Good Run. Set Library

0850 AIR BLANK

● Toluene

● E-Benzene

● mP-xylene

0900 Goto Site to get samples.

PREPARE SAMPLES

J. B. G. R.

5.7  
1.6  
7.3

16 MAY 95

(58)

0923	025-007BH	0.5'-2.5'	10g
	● Benzene		2 ppb
	● Toluene		6 ppb
	● E-Benzene		1 ppb
	● mP-Xylene		3 ppb
0935	025-007BH	5'-7'	10g
	● Benzene		5 ppb
	● Toluene		12 ppb
	● E-Benzene		5 ppb
	● mP-Xylene		14 ppb
0946	025-007BH	10'-12'	10g
	● Benzene		4 ppb
	● Toluene		4 ppb
0957	025-007BH	15'-17'	10g
	● Benzene		4 ppb
	● Toluene		11 ppb
	● E-Benzene		1 ppb
1008	025-007BH	20'-22'	10g
	● Toluene		4 ppb
	● E-Benzene		1 ppb
1019	100 PPB BTEX STD		
	● E-Benzene	101 ppb	100 ppb
	● Toluene	83 ppb	100 ppb
	● E-Benzene	54 ppb	100 ppb

*JB*

16 MAY 95

(59)

MP-Xylene 75 ppb 100 ppb  
O-Xylene 1 ppb 100 ppb

1033 AIR BLANK

● Toluene

1044 025-005BH 0.5'-2.5' 5 ppb 10g

● Benzene

● Toluene

● MP-Xylene

1055 025-005BH 10'-12' 10g

● Toluene

● E-Benzene

1106 025-005BH 20'-22' 10g

● Benzene

● Toluene

● E-Benzene

● MP-Xylene

1118 Go to Site to get samples.

Prepare samples

1142 025-004BH 0.5'-2.5' 10g

● Toluene

1153 025-004BH 5'-7' 10g

● Benzene

● Toluene

*J. Byrd*

16 MAY 95

60

- E-Benzene
- MP-Xylene
- O-Xylene

10 ppb  
178 ppb  
157 ppb

1208 hunch (1.0 hr)  
1308 Back on base.  
Prep Samples.

1331 100 PPB BTEX STD

BENZENE  
TOLUENE  
E-BENZENE  
MP-Xylene  
O-Xylene

88 ppb  
87 ppb  
58 ppb  
78 ppb  
0 ppb

~~100 ppb  
110 ppb  
110 ppb  
110 ppb  
110 ppb~~

Go to rig to help them set  
up & move.

1415 100 PPB BTEX

----- STAND AHEAD IS FLAT.  
Rebuild 1 PPM & 100 PPB

BTEX STDs.

1439 ERASE LIBRARY

1442 100 PPB BTEX STD.

--- NO O-Xylene Peak.

Reset CARRIER GAS Flow to  
12 ul/min

*[Signature]*

16 MAY 95

61

GC PROCEDURES

1530 100 PPB BTEX STD  
Good Run. Set Library.

1548 1 PPM BTEX STD.  
Good Run. Set Library.

1602 10 PPM BTEX STD.  
Good Run. Set Library.

1617 AIR BLANK

● Benzene	1 ppb		
● Toluene	1 ppb		
● E-Benzene	6 ppb		
● MP-Xylene	9 ppb		
1630 025-004BH	10'-12'		10g
● Benzene	1 ppb		
● Toluene	4 ppb		
● E-Benzene	4 ppb		
● MP-Xylene	8 ppb		
1643 025-004BH	18'-20'		10g
● Benzene	1 ppb		
● Toluene	3 ppb		
1655 021-026BH	9'-10'		10g
● Benzene	1 ppb		
● Toluene	3 ppb		
1707 021-026BH	4'-6'		10g
● Benzene	1 ppb		

*[Signature]*

16 MAY 95

(62)

● Toluene 2 ppb  
 ● E-Benzene 4 ppb  
 ● mP-Xylene 5 ppb  
 1719-025-004BH 5'-7' Reshot 10g

● Benzene 1 ppb  
 ● Toluene 3 ppb  
 ● E-Benzene 2 ppb  
 ● mP-Xylene 6 ppb  
 1731 100 PPB DTEX STD

● Benzene 106 ppb  
 ● Toluene 103 ppb  
 ● E-Benzene 98 ppb  
 ● mP-Xylene 188 ppb  
 ● O-Xylene 68 ppb

Shut down GC  
 Secure B252  
 Secure B247  
 1748 Leave base  
 1805 At Hotel

7'  
 18.1  
 73  
 10.8

213  
 0.8  
 197  
 10.3  
 10.8 hrs.

*J. B. [Signature]*

DAY 16

WEDNESDAY 17 MAY 75

(63)

# GC PROCEDURES

0545 leave hotel  
Breakfast (0.5)

0635 On base  
Set up & Program GC.  
Build 10 PPM, 1 PPM, &  
100 PPB BTX STDs.

GAIN 1,000  
CARRIER GAS FLOW 12 gpl/min  
INJECTION VOL 100 µl  
GC OVEN Temp 40°C  
ANALYSIS Time 460 sec

0726 100 PPB BTX STD.  
~~Good Run. Set Library - B~~  
NO O-Xylene. Increase Run  
Time to 500 sec.

0742 100 PPB BTX STD  
NO O-Xylene.  
--- Adjust DRV 3 & DRV 4  
to (5 + A/6)

0757 100 PPB BTX STD  
Good Run. Set Library

0815 1 PPM BTX STD  
Good Run. Set Library  
J. B. Goff

17 MAY 95

(64)

0830 10 PPM BTEX STD

Good Run. Set Library

0845 AIR BLANK

• Benzene 1 ppb  
 • Toluene 12 ppb  
 • mP-Xylene 83 ppb  
 • o-Xylene 20 ppb  
 0858 021-027BH 4'-6' 10g

• Benzene 1 ppb  
 • Toluene 3 ppb  
 • mP-Xylene 31 ppb  
 • o-Xylene 11 ppb  
 0910 021-027BH 8'-10' 10g

• Toluene 3 ppb  
 • E-Benzene 3 ppb  
 • mP-Xylene 8 ppb  
 • o-Xylene 4 ppb  
 0921 AIR BLANK

• Benzene 2 ppb  
 • Toluene 1 ppb  
 0934 021-028BH 05'-2.5' 10g

• Toluene 2 ppb  
 • E-Benzene 2 ppb  
 • mP-Xylene 3 ppb

Brydfe



# GC PROCEDURES

17 MAY 95

(65)

● O-Xylene 2 ppb  
 0946 021-028BH  
 ● Toluene 2 ppb  
 ● E-Benzene 3 ppb  
 ● MP-Xylene 5 ppb  
 ● O-Xylene 5 ppb  
 0958 100 PPB BTEX STD CAL

Benzene	97 ppb	100 ppb
Toluene	70 ppb	100 ppb
E-Benzene	62 ppb	100 ppb
MP-Xylene	119 ppb	200 ppb
O-Xylene	51 ppb	100 ppb

1013 AIR BLANK

● Benzene 3 ppb  
 ● E-Benzene 1 ppb

1034 025-012BH 0.5'-2.5' 10g

● Benzene 3 ppb  
 ● Toluene 21 ppb  
 ● E-Benzene 17 ppb  
 ● O-Xylene 39 ppb

1040 025-012BH 5'-7' 10g  
 ● A lot of peaks, NO Readings

*J. B. [Signature]*

17 MAY 95

(66)

1101 025-012BH 5'-7' Reshot 10g

--- 20ml INJECTION

● ALL ND'S

1112 025-012BH 10'-12' 10g

● Benzene 48 ppb

● Toluene 31 ppb

● E-BENZENE 4 ppb

● O-XYLENE 14 ppb

1124 025-012BH 18'-20' 10g

● Benzene 41 ppb

● Toluene 46 ppb

CLEAN AREA

1145 ~~400~~ 33 Goto Site 17.

1200 Lunch (1.0)

1300 At Site 17. Goto B252

1321 100 PPB BTX STD. CAL

Benzene	77	ppb	100	ppb
Toluene	84	ppb	100	ppb
E-Benzene	80	ppb	100	ppb
MP-Xylene	151	ppb	200	ppb
O-Xylene	78	ppb	100	ppb

JB

J. Byrd

(67)

17 MAY 95

1336 AIR BLANK

● Benzene 3 ppb  
 ● E-Benzene 1 ppb  
 ● O-Xylene 73 ppb  
 0.5-2.5'

10g

1347 0.25-0.13BH

● Benzene 4 ppb  
 ● Toluene 3 ppb  
 ● E-Benzene 1 ppb  
 ● MP-Xylene 3 ppb

10g

1359 0.25-0.13BH

5'-7'  
 ● Benzene 3 ppb  
 ● Toluene 2 ppb  
 ● E-Benzene 20 ppb  
 ● O-Xylene 106 ppb

10g

1411 0.25-0.13BH

10'-12'  
 ● Benzene 4 ppb  
 ● Toluene 2 ppb  
 ● E-Benzene 4 ppb  
 ● MP-Xylene 2 ppb

10g

1429 0.25-0.13BH

18'-20'  
 ● Benzene 10 ppb  
 ● Toluene 17 ppb  
 ● E-Benzene 3 ppb  
 ● O-Xylene 4 ppb

J. Byrd

## GC PROCEDURES

17 MAY 95

(68)

1441 100 PPB BTEX STD

CAL

Benzene	96	ppb	100	ppb
Toluene	92	ppb	100	ppb
E-Benzene	87	ppb	100	ppb
MP-Xylene	178	ppb	200	ppb
O-Xylene	93	ppb	100	ppb
-- -- 33	--	--	--	--

1509 AIR BLANK

● BENZENE 1 ppb

1521 017-024BH 0.5'-2.5' 6g

● BENZENE 1 ppb

● E-Benzene 8 ppb

● O-Xylene 13 ppb

1533 017-024BH 4'-6' 10g

● BENZENE 4 ppb

● Toluene 1 ppb

● MP-Xylene 44 ppb

~~1546 017-024BH 8'-10' 33 15g~~

● 5

1546 017-024BH 0.5'-2.5' 10g

● BENZENE 6 ppb

● Toluene 1 ppb

● E-Benzene 4 ppb

Hynd

GC PROCEDURES

17 MAY 95

(69)

1558 017-024BH 8-10 9ppb 15g

●MP-Xylene  
●Benzene  
●E-Benzene  
●O-Xylene

1610 017-025BH 4-6 10g

●Benzene  
●Toluene  
●E-Benzene

1622 100 PPB BTX STD

CAL

BENZENE	96	ppb	100	ppb
Toluene	81	ppb	100	ppb
E-Benzene	64	ppb	100	ppb
MP-Xylene	115	ppb	200	ppb
O-Xylene	108	ppb	100	ppb

1636 AIR BLANK

●Benzene  
●E-Benzene  
●Toluene  
●O-Xylene

1648 017-022BH 0.5-2.5 10g

●Benzene  
●Toluene

*Handwritten signature*

17 MAY 95

(70)

● E-BENZENE	7 ppb	10g
● MP-XYLENE	12 ppb	
● O-XYLENE	1 ppb	
1659 017-0238H	0.5'-2.5'	
● BENZENE	3 ppb	
● TOLUENE	3 ppb	
● E-BENZENE	7 ppb	
● MP-XYLENE	9 ppb	
1713 017-0238H	4'-6'	10g
● BENZENE	10 ppb	
● TOLUENE	3 ppb	
● E-BENZENE	37 ppb	
● MP-XYLENE	98 ppb	
1724 017-0288H	0.5'-2.5'	10g
● BENZENE	13 ppb	
● TOLUENE	3 ppb	
● E-BENZENE	4 ppb	
1736 017-0288H	4'-6'	6g
● BENZENE	3 ppb	
● E-BENZENE	5 ppb	



Continued in Book 2



# GC Procedures

## SUMMARY OF GC ANALYSIS PROCEDURE

### Calibration

Prepare 100-ppb, 1-ppm, and 10-ppm working standards fresh each day according to the GC CALIBRATION section. Create a 3-point calibration with these three standards, according to the GC CALIBRATION and GC ANALYSIS sections. Be sure that correct standard concentration values are used for peaks representing more than one component, as recognized by the GC (e.g., 2 ppm for m,p-xylene peak).

### Sample Analysis

Prepare and analyze headspace from soil and water samples according to SOIL AND WATER SAMPLE PREPARATION. All samples will be consistently warmed in the water bath before headspace injection. If sample results are significantly greater than the 10-ppm standard (e.g., greater than 60 ppm for total BTEX), then the sample must be reanalyzed with dilution as needed to bring it into range of the standard used. Diluted samples are achieved either by injecting smaller gas volumes onto the GC or using less soil in preparing the headspace sample, as detailed in the GC ANALYSIS section. After analysis of every five samples (or after a lapse in GC operation of more than 2 hours), a QA/QC check must be performed, consisting of a calibration check and an air blank check.

### QA/QC Check

Perform a calibration check by analyzing an appropriate working standard again. If, after shooting a working standard, correct identification of all standard compounds and concentrations within the range of 80-120% of the specified calibration concentration is not achieved, then restore the standard compounds, peak numbers, and calibration concentrations in the library as detailed in GC CALIBRATION CHECK.

Perform an air blank check by injecting an open air sample into the GC. If the results are not "clean" (close to or less than 10 ppb for all analytes), then perform more stringent decontamination procedures on the syringe used for sample injection or evaluate whether there are significant volatiles present in the ambient air. Once a successful QA/QC check has been completed, proceed with analysis of samples again.

### Data Reporting

All injections, including successful and unsuccessful QA/QC checks, must be reported on the FIELD GC DATA SUMMARY. Changes in flowrate and other GC operating parameters must also be recorded as analyses progress. All concentrations reported on the SUMMARY should be recorded with no more than three significant digits, with the last digit reported being the ppb singles digit (e.g., record 5.673 ppb as 5,670 ppb, and record 24.856 ppb as 25 ppb).

## INSTRUMENT AND ASSOCIATED EQUIPMENT

- Photovac 10S+ with a dot matrix printer, electrical power cords (GC main cord and GC oven cord with wall transformer), and printer serial cable.
- Photovac-provided replacement injection port septa.
- Single stage (dual gauge) regulator with tubing, quick disconnect fitting, and tee with valve for gas syringe decontamination.

Photovac 10S+ GC SOP

3

October 11, 1994

# GC SETUP PROCEDURE

**Location** Place the GC upwind from the drilling locations and any other nearby engine exhaust sources. The GC should also be within reach of a 110 VAC power source. Refer to Figure 1 for setting up the GC.

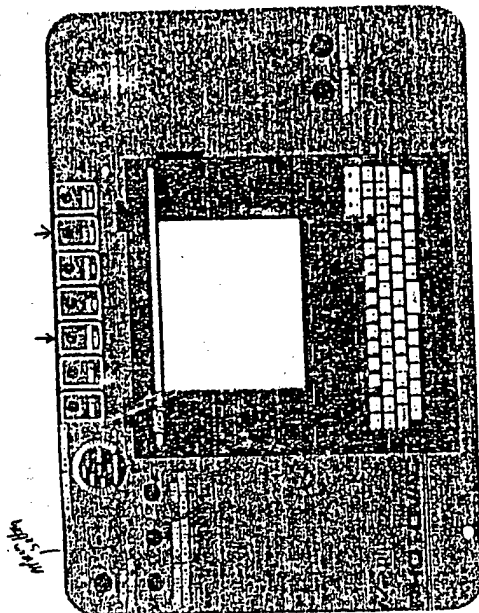


Figure 1 105+ Top Panel.

## Power & Software Loading

Connect AC line power to the 105+ GC at the DC IN port on the upper left corner of the GC, and then turn the unit on by pressing the ON button on the computer keyboard. The 105+ SYSTEM FUNCTION screen will be showing, with a message that a RAM APPLICATIONS CARD (blue with red dots) should be inserted into the lower right side of the computer. In order to load the GC software which is used for headspace analyses. Using the LOAD command, load the file GC FUNCTION (see Figure 2).

While still in the 105+ SYSTEM FUNCTION, use the TIME/SETUP command to set the correct time and date, as shown in Figure 3. After this is correctly set, switch to the GC operation software by pressing the FCN button. The screen which appears is

Photovac 105+ GC SOP

5

October 11, 1994

- Cylinder of zero-grade compressed air for use as the carrier gas
- Photovac digital (bubble) flowmeter or Photovac dual gas rotameters. If digital flowmeter is used, a soap solution is also required.
- 2000-ppm stock standard solution of BTEX and/or other chemicals (in methanol), contained in small, 1.5-mL vials with little or no headspace.
- 10-μL, 100-μL, and 500-μL gas syringes for gas headspace injection and working standard preparation.
- Electronic balance.
- 10-mL glass pipettes and rubber pipette bulb.
- 40-mL VOA vials (to prepare soil samples and working standards).
- 100% Nitrile gloves and safety glasses.
- Small ice chest for storage of samples and standards.
- Deionized water (10 mL to 10 grams of soil).
- Methanol (lab grade).
- Brush for decontamination of VOA vials.
- Small plastic tub, aquarium heater, and thermometer.
- All references herein refer to the Photovac 105+ GC manual.



referred to as the results screen, and is titled 10S+ GC FUNCTION. This screen shows current GC operation, and the chromatogram and detected peaks of the last analysis (see Figure 4).

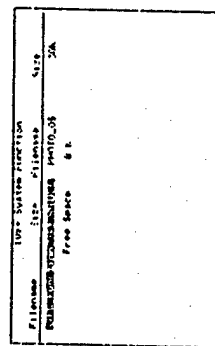


Figure 2 Loading GC Software.

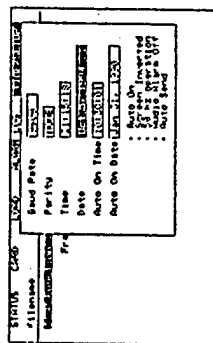
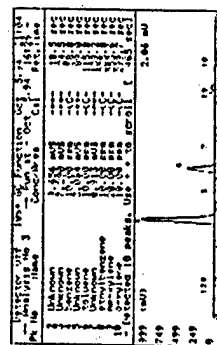


Figure 3 Setting Time and Date.



# GC PROGRAMMING FOR ANALYSIS

- Before carrying out analyses, certain operating parameters must be set (or their values checked) for proper and efficient operation of the GC to occur. The important parameters, their suggested values, and the command under which they are accessed are given in Table 1.

Table 1  
GC Operating Parameter Values

Command	Parameter	Value
STATUS	Normalized Chromatogram	Yes (checked)
METHOD/SETUP	Detector Flow	10-15 mL/min (notation only)
METHOD/SETUP	B/F Flow	10-15 mL/min (notation only)
METHOD/SETUP	Oven Set	40-50° C
METHOD/SETUP	Gain	1.000
METHOD	Loop or Syringe	Syringe (checked)
METHOD/TIMING	Inject Volume	0.100 mL $\approx 100 \mu\text{L}$
METHOD/TIMING	Analysis Time	400-600 secs
METHOD/INTEGRATION	Integration	Auto (checked)
NOTES	Notepad Entry	Enter standard information, such as GC operator name, ANG Base/Station, and sample ID.

- Use the commands specified in Table 1 to set the required values, including gain, syringe injection, injection volume, analysis time, and integration method. If auto integration is selected, the window and minimum area parameters do not need to be set. If manual integration is selected, enter a window value of 10% under METHOD/INTEGRATION METHOD. When the GAIN is set to 1000 and the Normalized Chromatogram is selected, the computer will automatically select the best gain value for the current chromatogram.
- User-supplied data can be entered for record purposes using the NOTES command. This will be used to keep track of samples on ANG field projects. Simply enter the desired information using the keyboard on the computer. The following information should be entered:

<name of GC operator>  
<name of National Guard Base or Station>  
<monitoring well or borehole designation, depth of sample interval (feet)>

Photovac 10S+ GC SOP

9

October 11, 1994

to STARTUP AND TUNING for several minutes. If the lamp does not come on after approximately 10 minutes, then it may be overheating. Turn the whole unit off, allow to cool for 15-20 minutes, and then turn it on and try again. Once the lamp is tuned and ready, successful gas chromatograms will be obtained only if OFFSET LEVEL is less than 100.0 mV and DETECTOR VOLTAGE is greater than 300 V (under STATUS command).

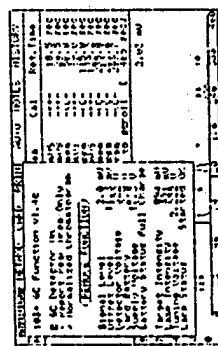


Figure 5 PID Lamp Status.

Selecting GC DETECTOR ON under the STATUS command also turns on the GC oven. The oven temperature is set by selecting the OVEN SET parameter (see Figure 6) under the METHOD/SETUP commands and entering an appropriate temperature (see page 4-2). The difference between the AMBI TEMP and the oven temperature setting can be no greater than 25 °C. 40 °C is a suitable oven temperature to select, as long as the ambient temperature is not below 15 °C (59 °F). It will take about 20 minutes to insure the oven is at constant temperature. The GC oven warmup can be monitored by viewing the OVEN TEMP versus OVEN SET values under the METHOD/SETUP command.

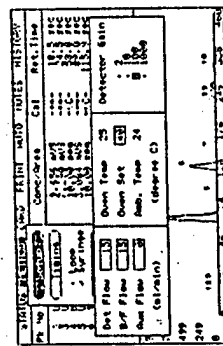


Figure 6 Setting GC Oven.

+ GC SOP

October 11, 1994

8

Page	No	Name	Address	City	State	Zip
247	247	John Doe	123 Main St	Anytown	CA	90210
248	248	Jane Smith	456 Elm St	Anytown	CA	90210
249	249	Bob Johnson	789 Oak St	Anytown	CA	90210
250	250	Carol White	101 Pine St	Anytown	CA	90210
251	251	David Brown	202 Maple St	Anytown	CA	90210
252	252	Evelyn Green	303 Birch St	Anytown	CA	90210
253	253	Frank Black	404 Cedar St	Anytown	CA	90210
254	254	Grace Hall	505 Spruce St	Anytown	CA	90210
255	255	Henry King	606 Willow St	Anytown	CA	90210
256	256	Irene Lee	707 Ash St	Anytown	CA	90210
257	257	Jack Miller	808 Hickory St	Anytown	CA	90210
258	258	Karen Wilson	909 Sycamore St	Anytown	CA	90210
259	259	Leo Taylor	1010 Magnolia St	Anytown	CA	90210
260	260	Mary Evans	1111 Dogwood St	Anytown	CA	90210
261	261	Nathan Scott	1212 Redwood St	Anytown	CA	90210
262	262	Olivia Adams	1313 Cypress St	Anytown	CA	90210
263	263	Peter Baker	1414 Juniper St	Anytown	CA	90210
264	264	Quinn Carter	1515 Fir St	Anytown	CA	90210
265	265	Rachel Davis	1616 Palm St	Anytown	CA	90210
266	266	Samuel Evans	1717 Olive St	Anytown	CA	90210
267	267	Tina Foster	1818 Cherry St	Anytown	CA	90210
268	268	Victor Green	1919 Peach St	Anytown	CA	90210
269	269	Wendy Hall	2020 Apple St	Anytown	CA	90210
270	270	Xavier King	2121 Banana St	Anytown	CA	90210
271	271	Yvonne Lee	2222 Grape St	Anytown	CA	90210
272	272	Zoe Miller	2323 Lemon St	Anytown	CA	90210
273	273	Adam Nelson	2424 Lime St	Anytown	CA	90210
274	274	Bella Parker	2525 Orange St	Anytown	CA	90210
275	275	Charlie Quinn	2626 Pear St	Anytown	CA	90210
276	276	Diana Reed	2727 Plum St	Anytown	CA	90210
277	277	Edward Scott	2828 Raspberry St	Anytown	CA	90210
278	278	Fiona Taylor	2929 Strawberry St	Anytown	CA	90210
279	279	George White	3030 Tangerine St	Anytown	CA	90210
280	280	Helen Wilson	3131 Ugli Fruit St	Anytown	CA	90210
281	281	Isaac Young	3232 Watermelon St	Anytown	CA	90210
282	282	Julia Ziegler	3333 Zucchini St	Anytown	CA	90210
283	283	Kyle Adams	3434 Eggplant St	Anytown	CA	90210
284	284	Laura Baker	3535 Artichoke St	Anytown	CA	90210
285	285	Mark Carter	3636 Asparagus St	Anytown	CA	90210
286	286	Nancy Evans	3737 Broccoli St	Anytown	CA	90210
287	287	Oscar Foster	3838 Cauliflower St	Anytown	CA	90210
288	288	Pamela Green	3939 Corn St	Anytown	CA	90210
289	289	Quinn Hall	4040 Cucumber St	Anytown	CA	90210
290	290	Rachel King	4141 Pumpkin St	Anytown	CA	90210
291	291	Samuel Lee	4242 Spinach St	Anytown	CA	90210
292	292	Tina Miller	4343 Swiss Chard St	Anytown	CA	90210
293	293	Victor Nelson	4444 Turnip St	Anytown	CA	90210
294	294	Wendy Parker	4545 Beet St	Anytown	CA	90210
295	295	Xavier Quinn	4646 Potato St	Anytown	CA	90210
296	296	Yvonne Reed	4747 Sweet Potato St	Anytown	CA	90210
297	297	Zoe Scott	4848 Yam St	Anytown	CA	90210
298	298	Adam Taylor	4949 Winter Squash St	Anytown	CA	90210
299	299	Bella White	5050 Acorn St	Anytown	CA	90210
300	300	Charlie Wilson	5151 Chestnut St	Anytown	CA	90210

### GC ANALYSIS OF SAMPLES OR STANDARDS

Headspaces from samples or working standards are analyzed on the GC to determine the presence and concentration of BTEX or other compounds of interest. Before injecting headspaces from a sample or working standard into the GC, the working standard VOA vial must be warmed to room temperature. This will be accomplished by placing the VOA vial containing the standard or sample in the water bath for 15 minutes prior to vapor sample injection. The temperature of the water in this bath will be kept constant, at anywhere from 25° to 30° C. using the small aquarium heater and a thermometer.

- To perform a GC analysis or GC run, push RUN AUTO and select SAMPLE. Take a 100- $\mu$ L or 500- $\mu$ L sample syringe and draw in 100  $\mu$ L of clean air. Insert the needle through the septa in the vial and repeatedly purge and draw 100  $\mu$ L (0.100 mL) of headspace into the syringe 10-15 times. Then draw exactly 100  $\mu$ L of headspace into the syringe.
- Push ENTER on the GC. Now quickly extract the syringe from the working standard vial and insert it into the INJECTION PORT 1. Let the needle go down until you feel the resistance of the septa in the injection port. Once the alarm begins to sound, push the syringe through the septa and all the way down into the injection port. IMMEDIATELY after the alarm goes off, QUICKLY inject the contents of the syringe into the GC and pull the syringe out of the injection port.
- The GC will now analyze the sample or standard. The duration of the analysis will be that time, in seconds, which was entered for ANALYSIS TIME during the GC programming steps. Peaks will appear representing the compounds in the sample. To stop the run before it is complete (e.g., if an obvious error has been made), press the RUN AUTO button. After a run is complete, the compounds detected and their concentrations will be printed in a table format above the chromatogram on the video screen.

10

October 11, 1994

- Temperature of GC oven.
- Analysis time and gain settings.
- Carrier gas flowrate.
- Injection volume.

Finally, once the entire 3-point calibration has been initially established for the day, the response factor values (under **LIBRARY STORE WINDOW** (see Figure 9)) and retention times (under **METHOD/LIBRARY**) for each analyte should be recorded in the bottom table of the **Field GC Summary Data**.

## GC CALIBRATION WITH HEADSPACE STANDARDS

1. Daily working standards are prepared in a clean 40-mL glass VOA vial with teflon septa following the formula below.

$$10 \text{ ppm} = \frac{SV}{10000} \times SC$$

$$C = \frac{(SV) \times SC}{(SV)}$$

$$SV = 1000 \mu\text{L}$$

Where:  
 C = Working standard concentration (ppm);  
 SV = Volume of stock solution (in microliters);  
 WV = Volume of deionized water (in microliters) - 10,000  $\mu\text{L}$  typical (10 mL); and  
 SC = Stock solution concentration (ppm).

Three standards will be prepared and used each day (0.1- (100 ppb), 1.0- and 10.0-ppm standards) to create a 3-point calibration. A standard is prepared by putting 10 mL of DI water in a 40-mL VOA vial, and then adding the required amount of concentrated standard from the stock solution. Preparation of the 100-ppb standard is performed by taking liquid (not headspace) from the 1-ppm calibration standard and diluting it with 10 mL of water in a second 40-mL VOA vial. Table 2 outlines the volumes and final concentrations for these three standards (as calculated by the above formula).

Table 2  
Working Standards Preparation

Working Standard Concentration	Stock Solution	Volume Taken from Stock
10 ppm	2000 ppm stock solution	50 $\mu\text{L}$
1 ppm	2000 ppm stock solution	5 $\mu\text{L}$
100 ppb	1 ppm working standard	1000 $\mu\text{L}$ (1.0 mL)

Always use the appropriate syringe for dispensing very small volumes accurately (e.g., use 500- $\mu\text{L}$  syringe to dispense 500  $\mu\text{L}$ ; use 10- $\mu\text{L}$  syringe to dispense 5  $\mu\text{L}$  or less). Shake the vial vigorously to mix after adding all components. Both the stock solution and working standards must always be stored inverted in a refrigerator or an ice chest. New working standards MUST be made fresh daily.

If other components are to be analyzed in addition to BTEX (such as trichloroethylene), then the 10- or 1-ppm standards are prepared by adding the specified volume (50 or 5  $\mu\text{L}$ ) from each separate stock solution. Never mix any separate 2000-ppm stock solutions directly together.

Analyze standards as described in the GC ANALYSIS section. An example chromatogram of a BTEX working standard is shown in Figure 8, including typical peaks for all of the components. Note that m,p-xylene is actually two components represented by one peak. If this is a 1-ppm standard, then this particular peak represents 2 ppm of those components.

If additional analytes (trichloroethylene, etc.) are being employed, the peaks are identified amongst the recognizable BTEX peaks and the order of analytes on the chromatogram

established as follows: (a) analyze standards containing each analyte separately, and compare retention times to those obtained for the BTEX standard; (b) compare the order of analytes established in (a) to the order (as given by relative retention times) given in Table 3.

Table 3  
Characteristic Retention Times

Compound	Retention Times (Normalized to Benzene)			
	Ambient 20° C	30° C	40° C	50° C
Vinyl Chloride	0.288	0.306	0.361	0.413
Freon 11	0.365	0.379	0.428	0.448
Methylene Chloride	0.475	0.489	0.539	0.585
trans-1,2-Dichloroethylene	0.517	0.529	0.563	0.580
1,1-Dichloroethane	0.550	0.557	0.611	0.669
Chloroform	0.715	0.720	0.742	0.752
1,2-Dichloroethane	0.840	0.851	0.868	0.872
1,1,1-Trichloroethane	0.948	0.950	0.959	1.000
Benzene	1.000	1.000	1.000	1.000
Carbon Tetrachloride	1.095	1.050	1.048	1.086
1,2-Dichloropropane	1.266	1.254	1.214	1.192
Trichloroethylene	1.413	1.396	1.342	1.361
2-Chloroethyl Vinyl Ether	1.667	1.644	1.551	1.539
1,1,2-Trichloroethane	2.293	2.211	1.976	1.860
Toluene	2.693	2.621	2.358	2.339
Tetrachloroethylene	3.985	3.853	3.314	3.272
Chlorobenzene	5.153	4.962	4.148	4.076
Ethyl Benzene	6.223	5.985	4.882	4.743
Bromobenzene	6.282	5.261	4.713	4.351
m-xylene	6.767	6.490	5.247	5.071
o-xylene	8.145	7.826	6.234	5.979
1,1,2,2-Tetrachloroethane	8.311	7.190	5.943	5.345

4. The ANALYSIS TIME, DRV3, and DRV4 times can be adjusted to obtain a suitable chromatogram of the working standard, if one like that in Figure 8 is not initially obtained. If the chromatogram does not show any of the last peaks (xylenes or ethylbenzene), the following adjustments should be made in order. After each adjustment, reinject a headspace sample of the working standard and watch for the latter peaks to appear on the new chromatogram.

- Adjustment I. Increase ANALYSIS TIME, to 600 or 700 seconds. As an alternative, carefully adjust the carrier gas flowrate upwards to 15 mL/min.
- Adjustment II. Adjust the DRV3 and DRV4 off times (under METHOD/TIMING/CONFIG command) to the formula  $5 + A/6$  (A represents the analysis time).

- The 3-point calibration is initially created by analyzing the three standards in succession, starting with the lowest concentration, and storing the calibration information (using METHOD/LIBRARY/STORE) for each analyte after each chromatogram is obtained. The process is performed as follows: select METHOD/LIBRARY, select STORE, press ENTER for each compound you wish to store, then fill in the appropriate entries in the LIBRARY STORE WINDOW (peak #, compound name, and Conc.) for each compound (see Figure 9). THIS PROCESS CAN BE SUCCESSFULLY COMPLETED ONLY AFTER THE CHROMATOGRAPHIC ANALYSIS OF A WORKING STANDARD APPEARS IN THE RESULTS WINDOW. The 100-ppb standard is entered as Conc. 1 (as 0.1 ppm), the 1.0-ppm standard as Conc. 2, and the 10-ppm standard as Conc. 3, as each standard is analyzed. Also, Alarm 1 and 2 values should be set to 50 ppm. After the correct concentration is entered for the current analysis, press ENTER. At this time, the GC calculates and stores the correct response factor and retention time for that peak. Repeat this process for each peak or analyte in the current standard, then move on to the analysis and library storing of the next higher standard. Figure 9 shows the library information for benzene after all calibrations are complete while Figure 10 shows the 3-point calibration which has been created.

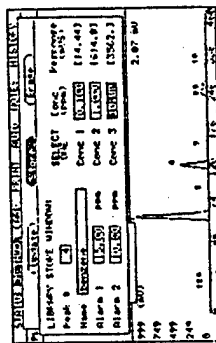


Figure 9 Library Store Window.

After all compound peak numbers and standard concentrations have been entered in the library, select METHOD and REINTEGRATE to reanalyze the last chromatogram and set all compounds to the specified concentrations. Finally, to obtain a hard copy, print out the standard chromatogram by selecting the PRINT/ANALYSIS command.

#### GC CALIBRATION CHECK

- The calibration must be checked after analysis of every five samples. Only one of the three standards is used to check the calibration, namely that standard whose nominal concentration is closest to but greater than the concentrations of recent sample results (see ranges shown on calibration curve of Figure 10). For example, if most sample results are running around 300 to 700 ppb, then the 1-ppm standard (medium range) would be used for the calibration check.
- A calibration check includes performing a repeated analysis of the chosen working standard headspace and reviewing the results printed out. If the compounds are not correctly identified and/or if the concentrations are not close to the nominal standard concentration (80-120% of

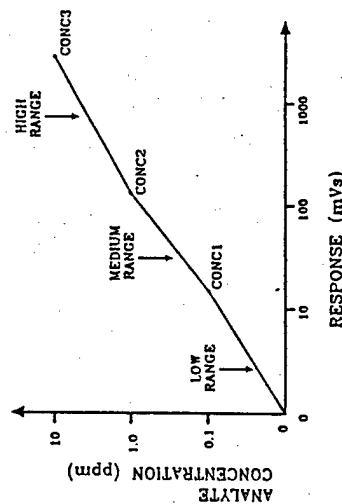


Figure 10 3-Point Calibration.

specified value), then a recalibration is necessary. This is done by storing again the peak numbers and concentrations of the chosen standard in the LIBRARY STORE WINDOW under the METHOD/LIBRARY/STORE command. Finally, REINTEGRATE and use PRINT/ANALYSIS to provide a hard copy record of the updated calibration.

#### SOIL AND WATER SAMPLE PREPARATION AND ANALYSIS

Consistency is very important in the preparation of soil samples. Collection and preparation of all soil samples should follow exact and consistent procedures in order to obtain meaningful results.

- The soil samples are collected in glass jars and placed in a cooler of ice which should be maintained at  $4^{\circ}\text{C}$  ( $\pm 2^{\circ}\text{C}$ ). Dispense 10 mL of DI water to each 40-mL VOA vial by use of a 10-mL pipet and an aspirator bulb. Approximately 10 grams of soil is collected from the glass jar and added to the 10 mL of DI water already in the 40-mL VOA vial. The weight of the soil added is determined by difference using the small electronic balance (water plus soil wt. - water wt. = soil wt.). The sample is capped with a teflon cap and is shaken for 30 seconds to mix and volatilize the BTEX or similar compounds. All samples must be warmed in the water bath for 15 minutes before injection of headspace onto the GC.
- Water samples are prepared by simply dispensing 10 mL of aqueous sample, using a 10-mL pipet and an aspirator bulb, into a 40-mL VOA vial, and shaking for 30 seconds to volatilize the components present. All samples must be warmed in the water bath for 15 minutes before injection of headspace onto the GC.

3. Analyze headspace from prepared soil or water samples according to the procedures given in the GC ANALYSIS section. Be careful not to inject any liquid water into the GC, as it will SEVERELY DAMAGE the column and render the instrument unusable. Remember to update the NOTEPAD with sample ID information. This can be done while the GC is performing an analysis.

4. Once the peak and concentration information is obtained from the analysis printout, the concentration of the compounds in the soil can be calculated using the formula below:

$$X = \frac{(PR) (WV)}{(SS)} \quad (\text{assume for water: } 1 \text{ gram} = 1 \text{ mL})$$

Where:

X = Contaminant concentration in soil sample (in ppm);

PR = Plotter reading (in ppm);

WV = Weight of deionized water solution (in grams); and

SS = Exact weight of soil sample (in grams).

Note: WV = 10 mL or 10 grams.

SS should be as close to 10 grams as possible.

1 ppm = 1 µg/mL.

If the soil sample is exactly 10 grams, then X = PR and no calculation is required.

#### SHUTDOWN

1. Shut down the IOS + GC by first selecting GC DETECTOR OFF under the STATUS command. This will turn off the PID lamp and the GC oven. Then select REMOVE FUNCTION under the STATUS command in order to clear out the GC for the next analysis session. The computer will prompt "Data will be lost," to which you can answer "Yes."

2. Press OFF. Replace the injection port septum every day or every other day (see page 8-7). Be sure the Teflon face of the septum is down and that the septum retainer is not over tightened upon replacement.

#### TROUBLESHOOTING

1. The instrument has been known to completely freeze up electronically, that is, no response occurs upon pressing any of the keys. To remedy this situation, open the computer module to reveal the column and electronics inside. In the upper left corner of the inside chamber, there is a red and black RESET switch. Press this switch to completely reset the instrument electronics. Close the computer module cover, and restart by pressing the main ON button. All setup and library information will have to be reprogrammed.

2. In the instance that a working standard is injected and the chromatogram comes out completely flat, check that carrier gas flow is on and set correctly, and that the DRV3 and DRV4 off times have not been accidentally reset to 0.

*Indoor Air Quality*  
ALL-WEATHER WRITING PAPER

Indoor writing products...  
...for outdoor writing people.

3. The septum in the INJECTION PORT 1 needs replacement if it loses resistance when the syringe is pushed through it. See page 8-7 for instructions on replacement.

4. Figure 11 presents some example problem chromatograms.

A. The later standard peaks (ethylbenzene, m,p-xylene, and o-xylene) do not come out. The ANALYSIS TIME or DRV3 or DRV4 time off operating parameters need to be adjusted as described in step 4 of GC CALIBRATION.

B. The methanol peak is obscuring the benzene and toluene peaks. Too much methanol is being carried over from decontamination activities. Allow methanol to dry off of the injection syringe before use.

C. Multiple peaks go significantly off the chromatogram right edge. Reduce the gain value to bring all of each peak within the chromatogram width.

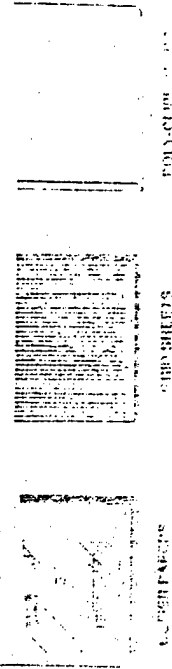
D. Benzene or other component saturates the entire chromatogram for an extended period of time. Dilute and reanalyze sample until separate (though perhaps overlapping) peaks appear on the chromatogram.

Chapter 9 provides a helpful table of other problem conditions and instructions for remedying the situation.

For other difficult problems, call Matt Alexander at the OpTech corporate office (1-800-677-8072) or a HAZCO representative (preferably Scott Robinson or Jeff Rogers) at 1-800-332-0435. When calling either OpTech or HAZCO, have available a clear description of the problem and example chromatograms. Also be prepared to receive instructions for conducting troubleshooting on-site.

#### REFERENCE

IOS plus Digital Gas Chromatograph User's Manual. Photovac, Inc., 25-B Jeffry Blvd. West, Deer Park, NY, (516) 254-4199.



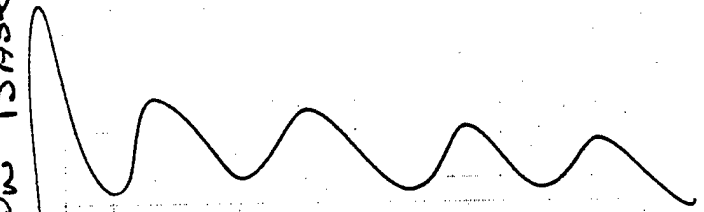
Hold data... if it's worth collecting, it's worth programming.

17 May 95

(71)

1748 100 PPB BTX STD  
• Benzene 2 ppb  
• Toluene 91 ppb  
• E-Benzene 96 ppb  
• mP-Xylene 138 ppb  
• o-Xylene 31 ppb

Shut down GC  
1805 KP-KM-DG show up. Unload  
Truck  
1821 Leave base  
1841 On Base



$\frac{197}{1.5} = \frac{213}{10.0}$   
11.5 hrs

COAL

CHARGE

DATE

$\frac{5.7}{0.5} = 6.2$

$\frac{10.5}{6.2} = 4.3$

213 - 4.3

$\frac{18.7}{3.7} = 5.0$   
 $\frac{5.0}{4.3} = 1.15$   
10.0

197 - 1.05

DAY 17

THURSDAY

18 MAY 95

0650 Leave hotel

Breakfast (0.6)

0650 ON BASE

Prepare truck for water

sampling PIDs for to  
CALIBRATE. 100 ppm Isobutylene

0747 CALL security for escort  
to Site Z6.

Set up Decon Area

Decon equipment

0820 Wrong keys. DRILLERS have

only set.

0830 Goto 8247. Advise KP.

Return to Site Z6.

Set up on 026-001MW.

0840 Begin Purging

0932 END Purging

PREPARE for Sampling.

Waiting for well to Recover

0953 Take Field Blank, SI-001FB

WAITING for well to

Recover

*J. Byrnes*

5.8  
+ .6  
6.4



18 MAY 95

(73)

~~1010 TAKE JB~~  
1012 Sample 026-001 MW  
done  
Decom Equipment  
Move to 026-002 MW  
1044 Begin ~~Sam~~ Purging.  
1125 Done  
1125 Begin Sampling.  
1144 ~~End~~ END Sampling.  
Rig Down. Decom.  
1204 AT 026-003 MW  
Set-up.  
1212 TAKE 026-003RB  
1220 Begin Purging  
1309 Done Purging  
Waiting for Recharge  
1315 Drillers move in to set.  
Guard Posts.  
1333 Start Sampling 026-003MW  
1345 Sample 026-00309 MW  
Rig down.  
1410 Escorted off 26  
1418 At 0247.  
Set up Decom & clean stuff

*JB*

18 MAY 95

(74)

1515 Set up on 025-002 MW

1628 Done purging  
Prepare sample bottles  
Wait on Recharge

1700 Sample

1710 Done

Prepare Ice chest for  
FEDEX

1725 Go to FEDEX

1750 Leave FEDEX

1800 On Base

clean up stuff

1823 Leave base

1841 At Hotel

18.7  
6.4  
12.3

12.3 hrs

*John*

DAY 18

(75)

FRIDAY

19 MAY 95

0545 leave hotel  
Breakfast (0.6)

0645 On Base  
load truck

0710 Fire-up GC. Build 10 PPM,  
1 PPM, & 100 PPM BTEX  
STD's

0740 AIR Flow is not working right.  
CALL EIS to see if they  
can troubleshoot.

0757 Drive KP to Site 17.

0825 BACK @ B252.

TALK to M. Alexander.

Fieldle w/ GC.

It won't go. CALL EIS.

Row is out. WAITING ON

his call back

0912 goto Site 17 to

approve KP of situation

0945 BACK @ B252

CALL EIS.

Attempt to backflush.

*J. Byrd*

19 MAY 95

(76)

1000 AFTER DISCUSSIONS w/ M. Alex-  
ander and EIS, will set  
both AIRflows and run  
standards. A very close  
monitoring of retention  
times will be done.

1056 100 PPB BTEX STD

--- NO Good

1109 1PPM BTEX STD.

--- This is not working.

CALL EIS. Order new GC.

Pack-up GC.

1202 Go to FEDEX

1215 Done at FEDEX. Go to Site 17.

1220 No one here. Return to

0247.

Prepare truck for sampling

1309 On 025-001MW for sampling

1420 Done Purging

1425 TAKE SI-802 FB (Potable WTR)

Waiting for 025-001MW to

Recharge.

1503 Sample 025-001MW

1518 Done Sampling

F. Byrd

19 MAY 95

77

1520 Go to B247 to Decon  
1530 Take sample 025-003RB  
1545 Go to 025-003MW  
1554 Begin purging  
1637 Done purging  
Waiting for recharge.  
1651 Call AIR Products.  
Schedule bottle pickup for  
next week  
1655 Call Burlington Express  
Schedule pickup for  
Monday w/ Wed. delivery  
1706 Sample 025-003MW  
1715 Sample 025-003AMW  
1720 Done. Break down and  
decon  
Move GC stuff from  
B252 to B247  
1835 Leave Base  
1858 AL Hotel

8  
18.0  
6.3  
12.7

12.7 hrs

gibby

DAY 19

(78)

SATURDAY 20 MAY 95

0548 Leave hotel

break-fast (0.6)

0645 DW Base

Set up new GC AREA.

Separate & pack stuff

Pack ICE chests (empty bottles)

for return to SPL.

Pack LELw/O<sub>2</sub> meter for

Return to HAZCO

0745 Build 10 PPM, 1 PPM &

100 PPB BTX STDs

0805 Continue Packing & Sorting

0840 Goto FEDEX to ship HAZCO

and SPL. Pick up GC.

0905 Leave FEDEX

0910 DW Base

Set up new GC, #139

• GAIN 1,000

• CARRIER GAS Flow 13 L/min

• Injection Vol 100 µl

• Oven Temp 40°C

• Analysis time 450 sec

0920 Printer is not printing

J. B. B. B.

$$\begin{array}{r} 5.8 \\ .6 \\ \hline 6.4 \end{array}$$

20 MAY 95

79

0955 CALL M. ALEXANDER TO FIND OUT  
IF A HAND COPY IS NEEDED.  
HE OK'S RUNNING ANALYSIS  
WITHOUT PRINT OUT OF  
RESULTS.

1019 100 PPB BTX STD

MISSED SHOT

1030 100 PPB BTX STD

Good Run. Set Library.

1046 1 PPM BTX STD.

RT's OFF. START

ALL OVER

1109 100 PPB BTX STD

Good Run. Set Library

1122 1 PPM BTX STD.

Good Run. Set Library

1135 10 PPM BTX STD

Good Run. Set Library.

1145 AIR BLANK

• BENZENE

• Toluene

• E-BENZENE

• MP-xylene

• O-xylene

13 ppb

5 ppb

28 ppb

40 ppb

95 ppb

*g. B. G. G.*

20 MAY 95

80

1157 026-001MW 10ml water

● Benzene 10 ppb

● Toluene 2 ppb

● E-Benzene 3 ppb

1207 026-002MW 10ml water

● Benzene 1 ppb

1218 026-003MW 10ml water

● ALL NDS

1227 025-001MW 10ml water

● ALL NDS

1236 025-002MW 10ml water

● Benzene 4 ppb

1245 100 PPB BTX STD

CALIBRANT	PPB	RT
Benzene	109	62.3
Toluene	97	126.5
E-Benzene	92	262.6
m-xylene	178	281.6
O-xylene	77	328.8

--- Recal to 100,100,100,200,200

1255 AIR BLANK

● ALL NDS

1304 025-003MW 10ml water

● Benzene 1920 ppb

*J. J. J.*



20 MAY 95

81

● Toluene	963 ppb
● E-Benzene	318 ppb
● MP-Xylene	1,400 ppb
● O-Xylene	1,090 ppb

1315 1 PPM BTX STD

— Benzene	1,020 ppb
— Toluene	1,040 ppb
— E-Benzene	1,110 ppb
— MP-Xylene	2,300 ppb
— O-Xylene	1,130 ppb

1328 Shut down GC.

Start Packing

1723 leave base

1749 At hotel

178  
6.4  
11.4

11.4 hrs

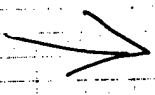
gBryndgr

21 MAY 95

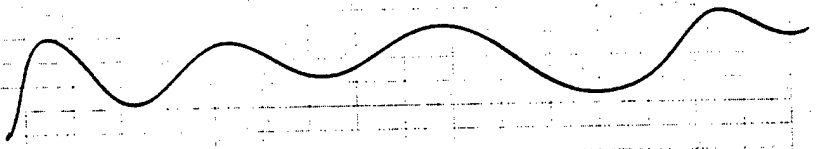
82

TRAVEL DAY

0830 leave hotel. Refuel Car.



1800 Home



9.5 hr

~~9.5 hr~~

**APPENDIX G**

**SURVEY REPORTS**

## **INTRODUCTION**

This appendix contains the survey report for the SI on soil borings and monitor wells at IRP Sites No. 25 and No. 26, and includes information such as elevation, depth and Minnesota State plane coordinates. The elevations for monitor wells were taken at the top of the well casings on the north side of the well. This appendix also includes surveyors' reports for wells and boreholes at IRP Sites No. 25 and No. 26.

**THIS PAGE INTENTIONALLY LEFT BLANK**

**Table G.1**  
**Summary of Elevations and Coordinates for**  
**Monitor Wells and Boreholes at IRP Sites No. 25 and No. 26**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Location IRP Site No. 25	North	East	Surface Elevation	Top of Casing Monitor Wells only
<b>Soil Borings</b>				
025-01BH	406,337.47	432,901.10	1,421.34	NA
025-02BH	406,391.88	432,901.10	1,421.24	NA
025-03BH	406,264.35	432,897.70	1,420.98	NA
025-04BH	406,273.70	432,754.82	1,423.53	NA
025-05BH	406,228.64	432,745.46	1,423.87	NA
025-06BH	406,143.67	432,877.29	1,421.05	NA
025-07BH	406,271.15	432,698.68	1,425.96	NA
025-08BH	406,108.76	432,921.52	1,421.97	NA
025-09BH	406,092.61	432,909.61	1,417.29	NA
025-010BH	406,003.34	432,939.38	1,398.19	NA
025-011BH	406,107.06	432,988.71	1,397.29	NA
025-012BH	406,386.78	432,897.70	1,421.29	NA
025-013BH	406,301.76	432,850.92	1,421.97	NA
<b>Monitor Wells</b>				
025-001MW	406,482.33	432,810.44	1,422.59	1,422.56
025-002MW	406,024.17	432,953.32	1,397.83	1,400.21
025-003MW	406,246.50	432,982.35	1,402.71	1,405.32
Location IRP Site No. 26	North	East	Elevation	Top of Casing Monitor Wells only
<b>Soil Borings</b>				
026-001BH	3,775.61	10,876.74	1,422.28	NA
026-002BH	3,692.45	10,873.01	1,421.61	NA
026-003BH	3,621.55	10,873.01	1,422.21	NA
026-004BH	3,775.61	10,978.40	1,423.90	NA
026-005BH	3,687.66	10,972.20	1,424.77	NA
026-006BH	3,614.09	10,968.46	1,425.43	NA
<b>Monitor Wells</b>				
026-001MW	3,568.25	10,933.27	1,424.69	1,424.62
026-002MW	3,801.20	10,863.84	1,421.90	1,424.28
026-003MW	3,670.70	10,767.12	1,420.44	1,422.90

BH - Borehole.  
NA - Not Applicable.

MW - Monitor Well.

**THIS PAGE INTENTIONALLY LEFT BLANK**

## **APPENDIX H**

### **INVESTIGATION DERIVED WASTE MANAGEMENT**



## INTRODUCTION

This appendix concerns the contents of the five drums of investigation derived waste which was generated during the SI at the 148th Fighter Wing, Minnesota ANGB, Duluth, Minnesota. Four of these drums contain soil cuttings and one contains monitor well development and purge water. Attached Table H.1 is a summary of the recommended disposition for each of these drums. Attached Table H.2 is a summary of the maximum concentrations of analytes contained in each drum containing soil from drill cuttings. Attached Table H.3 is a summary of the maximum concentrations of analytes contained in the drum containing well development and purge water.

**THIS PAGE INTENTIONALLY LEFT BLANK**

**Table H.1**  
**Recommended Disposition of Investigation Derived Waste**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Drum Identification	Origin	Recommended Disposition	Rationale
025-001BH 025-003BH	Drill cuttings Soil	Soil cuttings should be treated as petroleum-contaminated soil before returning to the site.	Based on analytical results, BTEX concentrations are greater than 5 ppm.
025-002BH 025-013BH	Drill cuttings Soil	Soil cuttings should be treated as petroleum-contaminated soil before returning to the site.	Based on analytical results, BTEX concentrations are greater than 5 ppm.
025-006BH	Drill cuttings Soil	The soil cuttings can be returned to the site.	Based on analytical results, BTEX concentration is 0.005 ppm.
025-003MW	Drill cuttings Soil	Soil cuttings should be treated as petroleum-contaminated soil before returning to the site.	Based on GC screening results, BTEX concentrations are greater than 5 ppm.
025-003MW	Development and Purge Water	Determine whether City of Duluth Waste-Water Management will allow BTEX-contaminated water to be disposed of in the City sewer system.	Based on analytical results, BTEX concentrations exceeded the Federal and State ARARs.

BH - Borehole.  
MW - Monitor Well.  
ppm - parts per million.  
GC - Gas Chromatograph.

BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes.  
ARARs - Applicable or Relevant and Appropriate Requirements.

**Table H.2**  
**Site Investigation Derived Waste – Drums Containing Soil Cuttings**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Analyte	Maximum Concentrations ( $\mu\text{g}/\text{kg}$ )	Action Level Concentrations ( $\mu\text{g}/\text{kg}^*$ )	Standards Used
<b>BTEX</b>			
Benzene	84,000	NA	—
Ethylbenzene	140,000	NA	—
Toluene	460,000	NA	—
Xylenes	680,000	NA	—
<b>SVOCs</b>			
2-methylnaphtalene	12,000	NA	—
Naphthalene	14,000	NA	—
Pyrene	360	NA	—
Flouranthene	420	NA	—
<b>Metals</b>			
Nickel	25	NA	—

\* — There are no State cleanup levels for the above analytes  
 $\mu\text{g}/\text{L}$  — micrograms per liter.

**Table H.3**  
**Site Investigation Derived Waste – Drum Containing Development and Purge Water**  
**148th FW, Duluth ANGB, Duluth, Minnesota**

Analyte	Maximum Concentrations in Development an Purge Water ( $\mu\text{g}/\text{L}$ )	Action Level Concentration ( $\mu\text{g}/\text{L}$ )	Standard Used
<b>BTEX</b>			
Benzene	2,600	10	HRL
Ethylbenzene	1,300	700	HRL
Xylenes (total)	1,450	10,000	HRL
<b>SVOCs</b>			
4-Methylphenol	8	3	HRL

$\mu\text{g}/\text{L}$  — micrograms per liter.

## **APPENDIX I**

### **GEOTECHNICAL REPORT**

## INTRODUCTION

This appendix presents geotechnical data for soil samples from the Site Investigation at IRP Site No. 26. On the following pages are grain-size distribution reports for soil samples collected from monitor wells 026-002MW and 026-003MW. Also presented in this appendix are permeability test lab data (vertical hydraulic conductivity) and information on pH cation exchange capacity for soil samples collected from monitor wells. The chain-of-custody forms for these soil samples are also included in this appendix. Grain size ranged from clay-sized particles to fine gravel, with silt and fine sand making up the majority of the soil constituents.

**THIS PAGE INTENTIONALLY LEFT BLANK**

NORTHEAST TECHNICAL SERVICES, INC.  
P.O. Box 1142  
315 Chestnut Street  
Virginia, Minnesota 55792  
(218) 741-4290 Fax (218) 741-4291

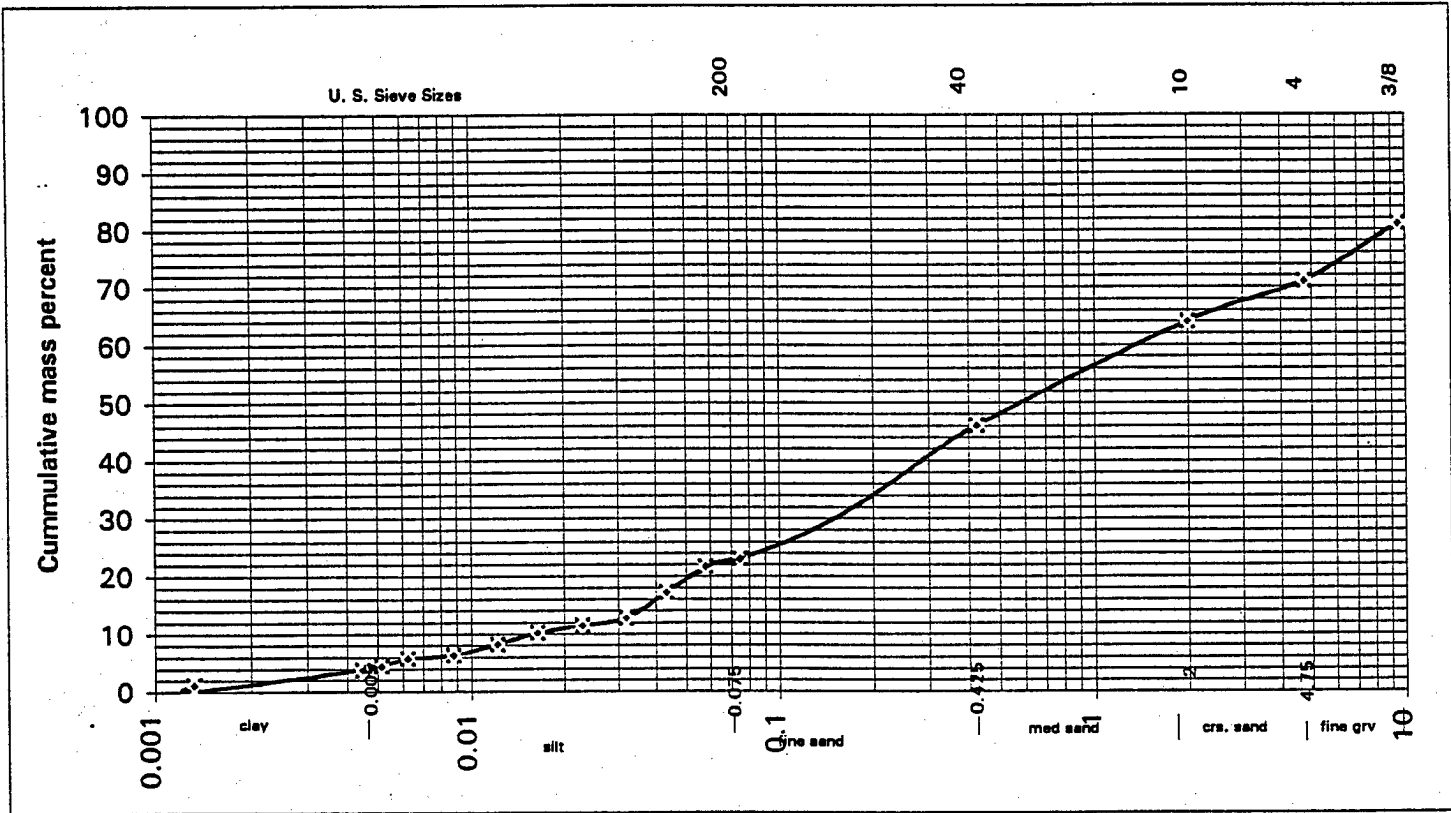
GRAIN SIZE DISTRIBUTION REPORT

Project: OTC - Duluth Air Base

Job # 3482.09

Sample #: #1 226-002MW 0.5' - 2.5'

Date: 24-May-95



Size	Percentages	Classification	Percent Moisture	Organic Content
Clay	4	SM silty sand with gravel	17.8	0%
Silt	18			
Fine Sand	24			
Medium Sand	18			
Coarse Sand	7			
Fine Gravel	29			



NORTHEAST TECHNICAL SERVICES, INC.  
P.O. Box 1142  
315 Chestnut Street  
Virginia, Minnesota 55792  
(218) 741-4290 Fax (218) 741-4291

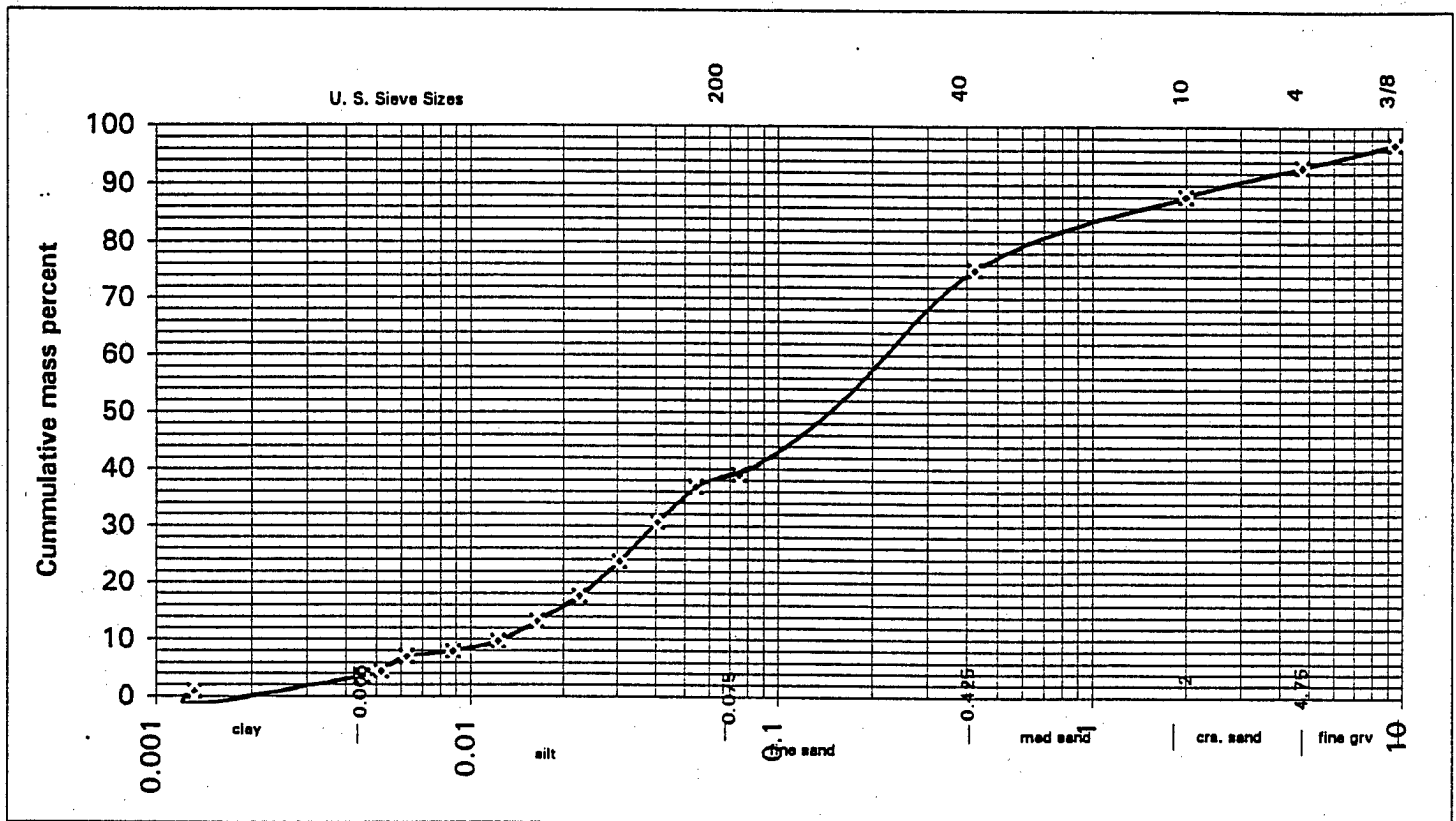
## GRAIN SIZE DISTRIBUTION REPORT

Project: OTC - Duluth Air Base

Job # 3482.09

Sample #: #2 026-003MW 15-17

Date: 24-May-95



Size	Percentages	Classification	Percent Moisture		Organic Content	
Clay	5	SM silty sand	14.8		13.80%	
Silt	34					
Fine Sand	36					
Medium Sand	13					
Coarse Sand	5					
Fine Gravel	7					

### PERMEABILITY TEST LAB DATA

<b>DATE:</b>	5/17/95	<b>PROJECT #:</b>	3482.09
<b>REPORT</b>	Operational Technologies Corp. 4100 NW Loop, Suite 230 San Antonio, TX 78229-4253		Permeability Tests on Brass Sleeve Samples from the Duluth Air Base IRP Site 26 Duluth, MN

---

<b>Sample Number:</b>	#1 026-002MW	#2 026-003MW
<b>Sample Location:</b>	0.5 - 2.5	15 - 17
<b>Soil Classification:</b>	SM silty sand w/gravl	SM silty sand
<b>Elevation:</b>		
<b>Type of Sample:</b>	Brass liner sample	Brass liner sample
<b>Specimen Height (cm):</b>	14.5	13.35
<b>Specimen Diameter (cm):</b>	3.5	3.5
<b>Water Content %:</b>	8.4	14.8
<b>Dry Unit Weight (lbs/cf)</b>	106.2	123.3
<b>Max. Head Differential (ft):</b>	4.00	4.00
<b>Confining Pressure (psi):</b>	2.00	2.00
<b>Coefficient of Permeability K @ 20 C (cm/sec)</b>	$1.10 \times 10^{-3}$	$3.55 \times 10^{-6}$
<b>Permeant Liquid Used</b>	distilled water	distilled water

# Northeast Technical Services, Inc.

315 CHESTNUT STREET • P.O. BOX 1142 • VIRGINIA, MINNESOTA 55792 • (218) 741-4290 • FAX (218) 741-4291

Lab Number: 95-3701

TO: Duluth Ang/Duth SI

MN Environmental Lab No:  
#027-137-157

Date Collected: 05/06/95

Date Received: 05/08/95

Date Reported: 05/23/95

Sample Description: 026-002-MW-0.5-2.5


Parameter

Result

-----  
pH

-----  
6.56 SU

Cation Exchange Capacity 127 meg/100 grams

Report approved by:   
JOHN H. SEURER  
ANALYTICAL SERVICES

Analyses were performed by methods approved by the U.S. Environmental Protection Agency and the Minnesota Department of Health.

Northeast Technical Services, Inc. makes no warranty except that the analysis has been made upon the samples received in accordance with generally accepted testing laboratory principles and practices. The results of the analysis may not be characteristic of the whole from which the sample was taken. This warranty is in lieu of all other warranties, either expressed or implied.

# Northeast Technical Services, Inc.

315 CHESTNUT STREET • P.O. BOX 1142 • VIRGINIA, MINNESOTA 55792 • (218) 741-4290 • FAX (218) 741-4291

Lab Number: 95-3700

TO: Duluth Ang/Duth SI

MN Environmental Lab No:  
#027-137-157

Date Collected: 05/06/95  
Date Received: 05/08/95  
Date Reported: 05/23/95

Sample Description: 026-003MW-15-17

Parameter

Result

-----  
pH

-----  
7.54 SU

Cation Exchange Capacity 45.6 meq/100 grams

Report approved by:  
JOHN H. SEURER  
ANALYTICAL SERVICES

*RMS*

Analyses were performed by methods approved by the U.S. Environmental Protection Agency and the Minnesota Department of Health.

Northeast Technical Services, Inc. makes no warranty except that the analysis has been made upon the samples received in accordance with generally accepted testing laboratory principles and practices. The results of the analysis may not be characteristic of the whole from which the sample was taken. This warranty is in lieu of all other warranties, either expressed or implied.



Environmental Laboratory, Inc.  
1880 Interchange Drive  
Houston, Texas 77054  
(713) 660-0901

# Analysis Request and Chain of Custody Record

Project No.		Client/Project Name		Project Location				
1315-197		Duluth ANG/Duth ST-1		TRP Site 26				
Field Sample No./ Identification	Date and Time	Q3	Q4	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, Etc.)	Preservative	ANALYSIS REQUESTED	LABORATORY REMARKS
026-003 MW	6 MAY 95	X		BRASS SLEEVE (3)	SOIL	NONE	ASTM Method for pH, cation exchange, soil particle size distribution, capacity, density, vadose zone vertical hydraulic conductivity	
026-002 MW	6 MAY 95	X		(2)				
026-001 MW	6 MAY 95	X						
026-004 MW	6 MAY 95	X						
026-005 MW	6 MAY 95	X						
026-006 MW	6 MAY 95	X						
026-007 MW	6 MAY 95	X						
026-008 MW	6 MAY 95	X						
026-009 MW	6 MAY 95	X						
026-010 MW	6 MAY 95	X						
026-011 MW	6 MAY 95	X						
026-012 MW	6 MAY 95	X						
026-013 MW	6 MAY 95	X						
026-014 MW	6 MAY 95	X						
026-015 MW	6 MAY 95	X						
026-016 MW	6 MAY 95	X						
026-017 MW	6 MAY 95	X						
026-018 MW	6 MAY 95	X						
026-019 MW	6 MAY 95	X						
026-020 MW	6 MAY 95	X						
026-021 MW	6 MAY 95	X						
026-022 MW	6 MAY 95	X						
026-023 MW	6 MAY 95	X						
026-024 MW	6 MAY 95	X						
026-025 MW	6 MAY 95	X						
026-026 MW	6 MAY 95	X						
026-027 MW	6 MAY 95	X						
026-028 MW	6 MAY 95	X						
026-029 MW	6 MAY 95	X						
026-030 MW	6 MAY 95	X						
026-031 MW	6 MAY 95	X						
026-032 MW	6 MAY 95	X						
026-033 MW	6 MAY 95	X						
026-034 MW	6 MAY 95	X						
026-035 MW	6 MAY 95	X						
026-036 MW	6 MAY 95	X						
026-037 MW	6 MAY 95	X						
026-038 MW	6 MAY 95	X						
026-039 MW	6 MAY 95	X						
026-040 MW	6 MAY 95	X						
026-041 MW	6 MAY 95	X						
026-042 MW	6 MAY 95	X						
026-043 MW	6 MAY 95	X						
026-044 MW	6 MAY 95	X						
026-045 MW	6 MAY 95	X						
026-046 MW	6 MAY 95	X						
026-047 MW	6 MAY 95	X						
026-048 MW	6 MAY 95	X						
026-049 MW	6 MAY 95	X						
026-050 MW	6 MAY 95	X						
026-051 MW	6 MAY 95	X						
026-052 MW	6 MAY 95	X						
026-053 MW	6 MAY 95	X						
026-054 MW	6 MAY 95	X						
026-055 MW	6 MAY 95	X						
026-056 MW	6 MAY 95	X						
026-057 MW	6 MAY 95	X						
026-058 MW	6 MAY 95	X						
026-059 MW	6 MAY 95	X						
026-060 MW	6 MAY 95	X						
026-061 MW	6 MAY 95	X						
026-062 MW	6 MAY 95	X						
026-063 MW	6 MAY 95	X						
026-064 MW	6 MAY 95	X						
026-065 MW	6 MAY 95	X						
026-066 MW	6 MAY 95	X						
026-067 MW	6 MAY 95	X						
026-068 MW	6 MAY 95	X						
026-069 MW	6 MAY 95	X						
026-070 MW	6 MAY 95	X						
026-071 MW	6 MAY 95	X						
026-072 MW	6 MAY 95	X						
026-073 MW	6 MAY 95	X						
026-074 MW	6 MAY 95	X						
026-075 MW	6 MAY 95	X						
026-076 MW	6 MAY 95	X						
026-077 MW	6 MAY 95	X						
026-078 MW	6 MAY 95	X						
026-079 MW	6 MAY 95	X						
026-080 MW	6 MAY 95	X						
026-081 MW	6 MAY 95	X						
026-082 MW	6 MAY 95	X						
026-083 MW	6 MAY 95	X						
026-084 MW	6 MAY 95	X						
026-085 MW	6 MAY 95	X						
026-086 MW	6 MAY 95	X						
026-087 MW	6 MAY 95	X						
026-088 MW	6 MAY 95	X						
026-089 MW	6 MAY 95	X						
026-090 MW	6 MAY 95	X						
026-091 MW	6 MAY 95	X						
026-092 MW	6 MAY 95	X						
026-093 MW	6 MAY 95	X						
026-094 MW	6 MAY 95	X						
026-095 MW	6 MAY 95	X						
026-096 MW	6 MAY 95	X						
026-097 MW	6 MAY 95	X						
026-098 MW	6 MAY 95	X						
026-099 MW	6 MAY 95	X						
026-100 MW	6 MAY 95	X						
026-101 MW	6 MAY 95	X						
026-102 MW	6 MAY 95	X						
026-103 MW	6 MAY 95	X						
026-104 MW	6 MAY 95	X						
026-105 MW	6 MAY 95	X						
026-106 MW	6 MAY 95	X						
026-107 MW	6 MAY 95	X						
026-108 MW	6 MAY 95	X						
026-109 MW	6 MAY 95	X						
026-110 MW	6 MAY 95	X						
026-111 MW	6 MAY 95	X						
026-112 MW	6 MAY 95	X						
026-113 MW	6 MAY 95	X						
026-114 MW	6 MAY 95	X						
026-115 MW	6 MAY 95	X						
026-116 MW	6 MAY 95	X						
026-117 MW	6 MAY 95	X						
026-118 MW	6 MAY 95	X						
026-119 MW	6 MAY 95	X						
026-120 MW	6 MAY 95	X						
026-121 MW	6 MAY 95	X						
026-122 MW	6 MAY 95	X						
026-123 MW	6 MAY 95	X						
026-124 MW	6 MAY 95	X						
026-125 MW	6 MAY 95	X						
026-126 MW	6 MAY 95	X						
026-127 MW	6 MAY 95	X						
026-128 MW	6 MAY 95	X						
026-129 MW	6 MAY 95	X						
026-130 MW	6 MAY 95	X						
026-131 MW	6 MAY 95	X						
026-132 MW	6 MAY 95	X						
026-133 MW	6 MAY 95	X						
026-134 MW	6 MAY 95	X						
026-135 MW	6 MAY 95	X						
026-136 MW	6 MAY 95	X						
026-137 MW	6 MAY 95	X						
026-138 MW	6 MAY 95	X						
026-139 MW	6 MAY 95	X						
026-140 MW	6 MAY 95	X						
026-141 MW	6 MAY 95	X						
026-142 MW	6 MAY 95	X						
026-143 MW	6 MAY 95	X						
026-144 MW	6 MAY 95	X						
026-145 MW	6 MAY 95	X						
026-146 MW	6 MAY 95	X						
026-147 MW	6 MAY 95	X						
026-148 MW	6 MAY 95	X						
026-149 MW	6 MAY 95	X						
026-150 MW	6 MAY 95	X						
026-151 MW	6 MAY 95	X						
026-152 MW	6 MAY 95	X						
026-153 MW	6 MAY 95	X						
026-154 MW	6 MAY 95	X						
026-155 MW	6 MAY 95	X						
026-156 MW	6 MAY 95	X						
026-157 MW	6 MAY 95	X						
026-158 MW	6 MAY 95	X						
026-159 MW	6 MAY 95	X						
026-160 MW	6 MAY 95	X						
026-161 MW	6 MAY 95	X						
026-162 MW	6 MAY 95	X						
026-163 MW	6 MAY 95	X						
026-164 MW	6 MAY 95	X						
026-165 MW	6 MAY 95	X						
026-166 MW	6 MAY 95	X						
026-167 MW	6 MAY 95	X						
026-168 MW	6 MAY 95	X						
026-169 MW	6 MAY 95	X						
026-170 MW	6 MAY 95	X						
026-171 MW	6 MAY 95	X						
026-172 MW	6 MAY 95	X						
026-173 MW	6 MAY 95	X						
026-174 MW	6 MAY 95	X						
026-175 MW	6 MAY 95	X						
026-176 MW	6 MAY 95	X						
026-177 MW	6 MAY 95	X						
026-178 MW	6 MAY 95	X						
026-179 MW	6 MAY 95	X						
026-180 MW	6 MAY 95	X						
026-181 MW	6 MAY 95	X						
026-182 MW	6 MAY 95	X						
026-183 MW	6 MAY 95	X						
026-184 MW	6 MAY 95	X						
026-185 MW	6 MAY 95	X						
026-186 MW	6 MAY 95	X						
026-187 MW	6 MAY 95	X						
026-188 MW	6 MAY 95	X						
026-189 MW	6 MAY 95	X						
026-190 MW	6 MAY 95	X						
026-191 MW	6 MAY 95	X						
026-192 MW	6 MAY 95	X						
026-193 MW	6 MAY 95	X						
026-194 MW	6 MAY 95	X						
026-195 MW	6 MAY 95	X						
026-196 MW	6 MAY 95	X						
026-197 MW	6 MAY 95	X						
026-198 MW	6 MAY 95	X						
026-199 MW	6 MAY 95	X						
026-200 MW	6 MAY 95	X						
026-201 MW	6 MAY 95	X						
026-202 MW	6 MAY 95	X						
026-203 MW	6 MAY 95	X						
026-204 MW	6 MAY 95	X						
026-205 MW	6 MAY 95	X						
026-206 MW	6 MAY 95	X						
026-207 MW	6 MAY 95	X						
026-208 MW	6 MAY 95	X						
026-209 MW	6 MAY 95	X						
026-210 MW	6 MAY 95	X						
026-211 MW	6 MAY 95	X						
026-212 MW	6 MAY 95	X						
026-213 MW	6 MAY 95	X						
026-214 MW	6 MAY 95	X				</		

## **APPENDIX J**

### **HAZARDOUS RANKING SYSTEM DATA PACKAGE**

## **INTRODUCTION**

This appendix presents information needed by personnel performing a Hazardous Ranking System (HRS) study.

**THIS PAGE INTENTIONALLY LEFT BLANK**



# **SITE INVESTIGATION (SI) DATA REQUIREMENTS FOR FEDERAL FACILITY DOCKET SITES**

## **DULUTH AIR NATIONAL GUARD STATION DULUTH, MINNESOTA**

- 1. Supply copies of all previous sampling data, on-site and off-site, including location map, detection limits, raw data sheets, QA/QC documents, date(s) sampled, analytical method(s) used, well or boring logs, and sampling technique(s).**

On-site and off-site sampling data, detection limits, and sampling techniques are found in Section 5 of this SI Report. Location maps are found in several sections of the SI Report including Section 1, Figure 1.1, Section 2, Figures 2.1 and 2.2. Raw data sheets, dates of sampling, and analytical methods are found in Appendix M of the SI. Well and boring logs can be found in Appendices C and A respectively. QA/QC documents are found in Appendix L.

- 2. Locate and identify on a map all known or suspected sources. Supply all information about source(s) such as: dates of operation, use, or spillage, amounts of material deposited, stored, or spilled, dimensions of source(s), known or suspected hazardous substances, etc.**

A map of IRP Site No. 25 is shown on Figure 2.1 of this SI. The source of contamination for the site is the old motor pool building which has been used for vehicle refueling, repair, storage, and maintenance. The source of suspected contamination is the outfall of the floor drains from the motor pool location. The old motor pool was in use from the late 1940s until the new motor pool was built in 1986. Known hazardous substances in use include unleaded and leaded gasoline, diesel fuel, waste solvents, and detergents.

As shown in Figure 2.2 of this SI, IRP Site No. 26, Ramp Disposal Area, is located to the west of Building (Bldg.) 500, which was built in 1952. The building has been in continuous use as an aircraft hangar and maintenance facility since that time. The aircraft parking ramp in front of Bldg. 500 has also been in continuous use since the earliest days of Duluth ANGB. Unknown quantities of contaminated aviation fuels and waste solvents were stored or disposed of on the soil adjacent to the ramp, according to information gathered from interviewees and aerial photography.

3. **Provide a description of all aquifers beneath the site, including a description of overlying materials, depth first encountered, thickness, and composition.**

A description of groundwater and soil conditions is included in Section III of the Preliminary Assessment (PA) conducted for Duluth ANGB by OpTech in 1993. A Generalized Stratigraphic Column and a Diagrammatic Geologic Cross-Section of the Duluth Complex are shown in Figures III-1 and III-2 of the 1993 PA, respectively. The U. S. Geological Survey (USGS) publishes Water Resources of the Lake Superior Watershed, Northeastern Minnesota, Hydrologic Investigations Atlas HA-582 and Water Resources of the St. Louis River Watershed, Northeastern Minnesota, Hydrogeologic Investigations Atlas HA-586, both of which may be obtained from USGS.

4. **For each source, choose one description from Table 1 that describes the groundwater contaminant. Provide complete documentation (i.e., engineering diagrams, original photos, etc.) as to why the source meets that description.**

IRP Site No. 25 source: Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures); no liner.

Rationale: As noted in the RCRA Facility Investigation by OpTech in August 1992 free product was detected downgradient from the old motor pool area. Interviewee information provided information that the 10,000-gallon (gal.) motor vehicle gasoline (MOGAS) underground storage tank (UST) in the old motor pool had been abandoned and filled with water in 1990. However, in the Spring of 1992, the tank was discovered with only 9 inches of water in it, leading the interviewee to conclude that the tank had a leak in it. BTEX and SVOCs in the naphthalene group, were detected in high concentrations in the soil samples taken near the former diesel and MOGAS USTs and waste solvent UST, respectively. BTEX, SVOCs, and 1,2 dichloroethane were detected in groundwater samples taken downgradient from the former diesel and MOGAS USTs.

IRP Site No. 26 source: Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures); no liner.

Rationale: The non-paved area adjacent to the aircraft ramp west of Bldg. 500 and extending up to the area west of Bldg. 499 was used to store unknown numbers of 55-gal. drums containing contaminated jet fuel. In addition, buckets of contaminated fuel were poured on the ground along the edge of the ramp. Discoloration of soil was visible

on aerial photos and soil staining was reported by former aircraft maintenance personnel. VOCs were detected in a duplicate, but not in the original soil sample. Polyaromatic hydrocarbons (PAHs) were detected in a near-surface soil sample taken near the aircraft ramp.

5. **Provide the location of all drinking water wells in all aquifers beneath the site in a 4-mile radius from the site (property boundary) by HRS distance ring and locate the wells within a one mile radius on a 7.5-minute topographic map. Provide information on depth of wells, screening intervals, depth of aquifers encountered, population served for multiple wells (i.e., municipal system), the number of wells, location of all wells (regardless of 4-mile limit), average annual pumpage from each well (regardless of 4-mile limit), and total population served by the system. Include information on all standby wells.**

A map with all drinking water wells within a 1-mile radius of Duluth ANGB is shown in Figure 3.1 of this SI. Additional private wells are located between two and four miles of the Duluth International Airport. All water well logs for these 63 privately-owned wells within this area are shown in Section Q of the appendices of the 1993 PA. The City of Duluth and nearby townships draw their drinking water from Lake Superior. Population figures are included in the response to Question 13. According to local agencies, no standby wells exist.

6. **Provide information and location (on a 7.5-minute topographic map) of wells within 4 miles that are used to irrigate 5 or more acres of commercial food or forage crops, or watering of commercial livestock, or ingredient in commercial food preparation, or supply for aquaculture, or supply for a major or designated water recreation area, excluding drinking water use.**

Two factors rule out well water being used extensively to support the commercial food chain in the Duluth area: (1) water for the irrigation of local crops and the watering of livestock is drawn from abundant surface water sources, and (2) commercial agriculture in the Duluth area is negligible. Literally hundreds of small creeks and ponds surround the Duluth ANGB; the water table is very high. An annotated topographic map, showing wetlands is shown in Section Q of the appendices of the 1993 PA, as well as an annotated topographic map showing local agricultural activity.

7. **What is the average number of persons per residence for the county (or counties) that the site is located in per the U. S. Census Bureau?**

According to 1990 Census data, the population of St. Louis County is 2.43 persons per residence.

8. **Identify and locate all surface water bodies within 2 miles of the site, marking off on the drainage routes (shown on a 7.5-minute topographic map) from each source to applicable surface water bodies. Provide the average annual cubic feet per second flow for each surface water body within 15 miles downriver, or 15-mile radius from the point of probable entry into surface water. For lakes, provide information on inflow and outflow.**

Miller Creek, which flows past the eastern perimeter of Duluth ANGB, is a minimally flowing water body, especially during the winter months, according the City of Duluth Area Hydrologist. The creek flow is not officially measured by local officials. Beaver Creek flows north from a north-south drainage ditch and eventually empties into Wild Rice Lake, north of Duluth International Airport. The annual cubic flow is not measured. Both creeks and the reservoir are shown on Figures III-3 and III-4 of the 1993 PA.

9. **What is the number of acres in each drainage basin?**

Miller Creek drains approximately 1,200 acres before it empties into Lake Superior. The creek traverses a broader plain as it passes Duluth ANGB and then becomes more channelized as it flows southeastward and eventually empties into Lake Superior. Beaver Creek drains both the 2,000-acre Duluth International Airport and an area of approximately 1,300 acres as it flows northward into Wild Rice Lake.

10. **Choose the predominant soil group (surface soil) which comprises the largest total area within each drainage area.**

The area within a 2-mile radius of Duluth ANGB is classified as Highland Moraine. Five major soil groups are found in this area. Soil Interpretations Records for the five major soil groups (Ahmeek, Hermantown, Twig, Cathro, and Rifle) are found in the Q Section of the appendices of the 1993 PA.

**11. What is the 2-year, 24-hour rainfall?**

The 2-year, 24-hour rainfall is 2.5 inches, according to the State of Minnesota Department of Natural Resources Area Hydrologist.

**12. Choose the floodplain category for each source (supply FEMA floodplain map) and determine if each source meets the selected floodplain criteria.**

Because Duluth ANGB is located on an elevated hill above the level of any flood sources, the Base is not located within any historic floodplains. Additionally, the Federal Emergency Management Agency has elected not to map either Duluth International Airport or the ANGB because of the non-existent flood threat.

**13. Provide the location of all drinking water intakes within 15 miles downstream (for rivers) or 15-mile radius (lakes, bays, etc.). Provide information on the population served. For multiple intakes (i.e., municipal systems) provide information on the number of intakes, the location of all intakes (regardless of the 15-mile limit), and the total population served by the system. Include information on all standby intakes.**

A map of the location of the single drinking water intake on Lake Superior that serves as the City of Duluth municipal water supply is found in the Q Section of the appendices of the 1993 PA. Section Q also provides a cross-section schematic of the City of Duluth municipal water supply. According to the Chief Engineer of the City of Duluth Water and Gas Department, the system averages 13 million gallons per day during the year, with summer peaks rising to 30 million gallons per day. The municipal water system serves approximately 105,000 people in the greater Duluth area, including the Duluth ANGB.

**14. Provide information and the location of all water intakes within 15 miles downriver (radius in lake or bay) that are used to irrigate 5 or more acres of commercial food or forage crops, or watering of commercial livestock, or ingredient in commercial food preparation, or supply for aquaculture, or supply for a major or designated water recreation area, excluding drinking water use.**

As discussed in Question 13, only one water intake serves the greater Duluth area. Abundant surface water augments City Water supplies for the resident population.

15. Is any surface water body 15 miles downriver (radius in lakes or bay) used for drinking water?

Lake Superior is within 15 miles of Duluth ANGB. It is the major surface water body that provides drinking water to the Duluth population.

16. What is the average human food chain production (pounds per year) for each surface water body 15 miles downriver or 15-mile radius in lake?

Not applicable. Source: Minnesota Department of Natural Resources.

17. Within a 4-mile radius from the site and 15 miles downriver or radius in a lake, identify all sensitive environments that exist. Provide original documentation (USF&W, Natural Heritage Database, State agencies, NOAA, etc.) and locate each area by HRS distance ring. Note that there could be multiple sensitive environments within a sensitive environment.

Sensitive environments are discussed in Section 3.0 of this SI Report. Figure 3.4 of the SI includes the locations of all sensitive environments in the vicinity of the Base. The Base itself does not include any sensitive environments.

18. What is the linear frontage of all wetlands 15 miles downriver or within a 15-mile radius from a lake?

To determine extent of wetland frontage, a National Wetlands Inventory Map overlay, dated November 1978, showing wetlands within the Duluth Heights 7.5-minute topographic map was utilized. Literally hundreds of wetlands, seasonal and permanent, exist within a 15-mile radius of the Base, and on all sides of the Base. The linear frontage, as a result, may be expressed in hundreds of miles. A topographic map of the Duluth ANGB area with the National Wetlands Inventory Map overlay is provided in Section Q of the appendices for the 1993 PA.

- 19. What is the location and number of persons residing, working, attending school or day care within 200 feet of each source?**

No schools or day care centers are located on Duluth ANGB. The nearest schools, Kenwood Elementary (population: 252), Home Craft Elementary (population: 445), and Central High School (population: 1,700) are located two miles or more from the Base.

IRP Site No. 25, Old Motor Pool: Bldgs. 240 and 242 are located in the old motor pool area. Four personnel work between both buildings. Across the street adjacent to the abandoned unleaded gasoline UST, 23 personnel work in Bldg. 231 and 2 people work in Bldg. 230. A map showing the 200-foot radius and population information is found Section Q of the appendices for the 1993 PA.

IRP Site No. 26, Ramp Disposal Area: A variety of aircraft maintenance facilities are located within 200 feet of Bldg. 500. A total of 32 personnel work in Bldgs. 203, 204, 199, 497, 498, and 214. A map showing the 200-foot radius and population information is found in Section Q of the appendices for the 1993 PA.

In all cases, on-Base population figures represent normal, daily use of the facilities. On guard weekends, the Base population greatly expands. Figures for Guard weekends are unavailable from Duluth ANGB sources.

- 20. Identify all terrestrial sensitive environments that exist on-site. Provide original documentation (USF&W, Natural Heritage Database, State agencies, NOAA, etc.) and locate each on a 7.5-minute topographic map. Note that there could be multiple sensitive environments within a sensitive environment.**

No terrestrial sensitive environments exist on-site.

- 21. For each source, choose one description from Table 8 that describes the accessibility of the site to a human population. Provide complete documentation (i.e., engineering diagrams, photographs (originals)) as to why the source meets that description.**

IRP Site No. 25, Old Motor Pool: Physically inaccessible to the public, with no evidence of public recreation use. Figure IV-1 of the 1993 PA shows the motor pool in a fenced area within the confines of the Duluth ANGB.

IRP Site No. 26, Ramp Disposal Area: Physically inaccessible to the public, with no evidence of public recreation use. Figure IV-2 of the 1993 PA shows the area adjacent to active aircraft taxiway/aircraft parking and maintenance area, which, at present, is also restricted from Base personnel.

22. What is the total number of people in the following distance rings from source(s)?

<u>Distance</u>	<u>Ring Total</u>	<u>Aggregate Total</u>
0-1/4 mile:	126	126
1/4-1/2 mile:	41	167
1/2-1 mile:	750	917
1-2 miles:	2,058	2,975
2-3 miles:	13,046	16,021
3-4 miles:	4,495	20,516

Use 1990 Census data and/or actual house counts. Document how calculated.

Raw 1990 Census data was gathered from the Arrowhead Regional Development Commission, Duluth, Minnesota. Data from Duluth and the townships of Canosia, Hermantown, and Rice Lake were included in computations. Mileage circles were used as overlays on 1990 Census tract maps, which were subdivided into Census blocks. All census blocks that fell within the mileage circles were included in their entirety. Partial blocks were interpolated for the percentage of the total census that was included. Direct computational involvement by the Arrowhead Regional Development Commission ensured accuracy in 1990 Census figures. A copy of the 1990 Census Tract Map is attached for informational purposes.

23. For each source, choose one description from Table 9 that describes the gaseous containment. Provided complete documentation (i.e., engineering diagrams, photographs (originals)) as to why the source meets that description. From Table 10, choose the appropriate description of each source type. For each source, choose one description from Table 11 that describes the particulate containment.



**Provide complete documentation (i.e., engineering diagrams, photographs (originals)) as to why the source meets the description.**

IRP Site No. 25, Old Motor Pool: Source covered with essentially impermeable, regularly inspected, maintained cover.

Rationale: The old motor pool facility is fully paved with an asphalt surface. Metal hatches are used to access the USTs. There are no open pathways for volatile gases to escape from the USTs. Figure IV-1 shows the configuration of the old motor pool area – the configuration is taken from current Base Civil Engineering drawings.

IRP Site No. 26, Ramp Disposal Area: Uncontaminated soil cover > 3 feet: Source substantially vegetated with little exposed soil.

- 24. What is the location and area (in acres) of all wetlands within a 4-mile radius of the site?**

See response to Question 18. According to the U. S. Fish and Wildlife Service National Wetlands Inventory Map dated November 1978, there are hundreds of acres of wetlands within a 4-mile radius of Duluth ANGB. The maximum HRS rating for this item should be used. The topographic map which includes wetlands is found in Section Q of the appendices of the 1993 PA.

- 25. Contact the United States Environmental Protection Agency (USEPA) Regional Office immediately if any radionuclides are present or suspected at a site and supply all radiological information known to date.**

No radioactivity has been recorded at IRP Sites No. 25 and No. 26.

- 26. For all of the above information, use primary data sources and supply 2 copies or specify where copies may be obtained.**

See 1993 PA Report.

**27. Have any removals or remedial actions taken place at the site(s)?**

IRP Site No. 25, Old Motor Pool: The USTs at the old motor pool were emptied and abandoned in 1986 when the new motor pool area was constructed. Actions were not taken as environmentally-focused remedial or removal actions, but as a normal part of the transition to the new motor pool facility.

IRP Site No. 26, Ramp Disposal Area: Remedial actions are under review at Duluth ANGB.

## **APPENDIX K**

### **SUMMARY OF ANALYTICAL RESULTS FOR SOIL AND GROUNDWATER SAMPLES**

## **INTRODUCTION**

The following is a list of analytical results for soil and groundwater samples collected at IRP Sites No. 25 and No. 26.

### **IRP SITE NO. 25**

#### **SOIL SAMPLES**

- K.1 – Volatile Soil Analytical Results for IRP Site No. 25
- K.2 – Semivolatile Soil Analytical Results for IRP Site No. 25
- K.3 – Metals Soil Analytical Results for IRP Site No. 25

#### **GROUNDWATER SAMPLES**

- K.4 – Halogenated Volatile Groundwater Analytical Results for IRP Site No. 25
- K.5 – Semivolatile Groundwater Analytical Results for IRP Site No. 25
- K.6 – Metals Groundwater Analytical Results for IRP Site No. 25

### **IRP SITE NO. 26**

#### **SOIL SAMPLES**

- K.7 – Volatile Soil Analytical Results for IRP Site No. 26
- K.8 – Semivolatile Soil Analytical Results for IRP Site No. 26
- K.9 – Metals Soil Analytical Results for IRP Site No. 26

#### **GROUNDWATER SAMPLES**

- K.10 – Volatile Groundwater Analytical Results for IRP Site No. 26
- K.11 – Semivolatile Groundwater Analytical Results for IRP Site No. 26

**THIS PAGE INTENTIONALLY LEFT BLANK**

# Volatile Soil Analytical Results for Site No. 25

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-001BH 6.5-7	025-002BH 11.5-12	025-003BH 11-12	025-003BH 11-12 Dup	025-004BH 11.5-12	025-004BH 19.5-20
Sample Date:	05/15/95	05/15/95	05/15/95	05/15/95	05/16/95	05/16/95
Lab Sample No.:	9505556-02	9505556-03	9505556-04	9505556-05	9505612-05	9505612-06
VOCs	Matrix	Soil	Soil	Soil	Soil	Soil
Acetone	250000 U	25000 U	500 U	25000 U	100 U	100 U
Benzene	84000	1700	25 U	1200 U	5 U	5 U
Bromodichloromethane	12000 U	1200 U	25 U	1200 U	5 U	5 U
Bromoform	12000 U	1200 U	25 U	1200 U	5 U	5 U
Bromomethane	25000 U	2500 U	50 U	2500 U	10 U	10 U
2-Butanone	50000 U	5000 U	100 U	5000 U	20 U	20 U
Carbon Disulfide	12000 U	1200 U	25 U	1200 U	5 U	5 U
Carbon Tetrachloride	12000 U	1200 U	25 U	1200 U	5 U	5 U
Chlorobenzene	12000 U	1200 U	25 U	1200 U	5 U	5 U
Chloroethane	25000 U	2500 U	50 U	2500 U	10 U	10 U
2-Chloroethylvinylether	25000 U	2500 U	50 U	2500 U	10 U	10 U
Chloroform	12000 U	1200 U	25 U	1200 U	5 U	5 U
Chloromethane	25000 U	2500 U	50 U	2500 U	10 U	10 U
Dibromochloromethane	12000 U	1200 U	25 U	1200 U	5 U	5 U
1,1-Dichloroethane	12000 U	1200 U	25 U	1200 U	5 U	5 U
1,1-Dichloroethene	12000 U	1200 U	25 U	1200 U	5 U	5 U
1,2-Dichloroethane	12000 U	1200 U	25 U	1200 U	5 U	5 U
total-1,2-Dichloroethene	12000 U	1200 U	25 U	1200 U	5 U	5 U
1,2-Dichloropropane	12000 U	1200 U	25 U	1200 U	5 U	5 U
cis-1,3-Dichloropropene	12000 U	1200 U	25 U	1200 U	5 U	5 U
trans-1,3-Dichloropropene	12000 U	1200 U	25 U	1200 U	5 U	5 U
Ethylbenzene	140000	9700	120	5300	5 U	5 U
2-Hexanone	25000 U	2500 U	50 U	2500 U	10 U	10 U
Methylene Chloride	12000 U	1200 U	25 U	1200 U	5 U	5 U
4-Methyl-2-Pentanone	25000 U	2500 U	50 U	2500 U	10 U	10 U
Styrene	12000 U	1200 U	25 U	1200 U	5 U	5 U
1,1,2,2-Tetrachloroethane	12000 U	1200 U	25 U	1200 U	5 U	5 U
Tetrachloroethene	12000 U	1200 U	25 U	1200 U	5 U	5 U
Toluene	460000	26000	25 U	1200 U	5 U	5 U
1,1,1-Trichloroethane	12000 U	1200 U	25 U	1200 U	5 U	5 U
1,1,2-Trichloroethane	12000 U	1200 U	25 U	1200 U	5 U	5 U
Trichloroethene	12000 U	1200 U	25 U	1200 U	5 U	5 U
Trichlorofluoromethane	12000 U	1200 U	25 U	1200 U	5 U	5 U
Vinyl Acetate	25000 U	2500 U	50 U	2500 U	10 U	10 U
Vinyl Chloride	25000 U	2500 U	50 U	2500 U	10 U	10 U
Xylenes (total)	680000	52000	800	29000	5 U	5 U

BH - Borehole  
VOC - Volatile Organic Compounds

U - Indicates compound was analyzed for but not detected

**Appendix K.1**  
**Volatile Soil Analytical Results for Site No. 25**  
**Duluth Air National Guard Base, Duluth, Minnesota**

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-005BH 11.5-12	025-006BH 21.5-22	025-007BH 11.5-12	025-008BH 10.5-11.0	025-008BH 14.5-15.0	025-009BH 11-12
Sample Date:	05/16/95	05/12/95	05/16/95	05/12/95	05/12/95	05/12/95
Lab Sample No.:	9505612-04	9505512-08	9505612-03	9505512-02	9505512-03	9505512-10
VOCs	Soil	Soil	Soil	Soil	Soil	Soil
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Acetone	100 U	100 U	100 U	100 U	100 U	100 U
Benzene	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	20 U	20 U	20 U	20 U	20 U	20 U
Carbon Disulfide	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloroethylvinylether	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
total-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U
Xylenes (total)	5 U	5	5 U	5 U	230	5 U

BH - Borehole

# Volatile Soil Analytical Results for Site No. 25 Duluth Air National Guard Base, Duluth, Minnesota (Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-009BH 11-12 Dup	025-009BH 14-14.5	025-010BH 2-2.5	025-010BH 6-6.5	025-011BH 2-2.5	025-011BH 6.5-7
Sample Date:	05/12/95	05/12/95	05/12/95	05/12/95	05/12/95	05/12/95
Lab Sample No.:	9505512-09	9505512-11	9505512-04	9505512-05	9505512-06	9505512-07
VOCs	Matrix	Soil	Soil	Soil	Soil	Soil
Acetone	100 U	100 U	100 U	100 U	100 U	100 U
Benzene	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	20 U	20 U	20 U	20 U	20 U	20 U
Carbon Disulfide	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloroethylvinylether	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
total-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	7	5 U	5 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	17	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U
Xylenes (total)	5 U	8	5 U	5	5 U	6

BH - Borehole  
VOC - Volatile Organic Compounds  
U - Indicates compound was analyzed for but not detected



# Appendix K.1

## Volatile Soil Analytical Results for Site No. 25 Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-012BH 11.5-12	025-012BH 19.5-20	025-013BH 11.5-12
Sample Date:	5/17/95	5/17/95	5/17/95
Lab Sample No.:	9505673-02	9505673-03	9505673-04
VOCs	Matrix	Soil	Soil
Acetone	100 U	100 U	100 U
Benzene	29	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U
2-Butanone	20 U	20 U	20 U
Carbon Disulfide	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U
2-Chloroethyvinylether	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U
Dibromochloromethane	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U
total-1,2-Dichloroethene	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U
2-Hexanone	10 U	10 U	10 U
Methylene Chloride	5 U	5 U	5 U
4-Methyl-2-Pentanone	10 U	10 U	10 U
Styrene	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U
Toluene	8	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U
Trichlorofluoromethane	5 U	5 U	5 U
Vinyl Acetate	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U
Xylenes (total)	11	5 U	5 U

# Appendix K.2

## Semivolatile Soil Analytical Results for Site No. 25 Duluth Air National Guard Base, Duluth, Minnesota (Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-001BH 6.5-7	025-002BH 11.5-12	025-003BH 11-12	025-003BH 11-12 Dup	025-004BH 11.5-12	025-004BH 19.5-20
Sample Date:	05/15/95	05/15/95	05/15/95	05/15/95	05/16/95	05/16/95
Lab Sample No.:	9505556-02	9505556-03	9505556-04	9505556-05	9505612-05	9505612-06
SVOCs	Matrix	Soil	Soil	Soil	Soil	Soil
Acenaphthene	330 U	330 U	330 U	330 U	330 U	330 U
Acenaphthylene	330 U	330 U	330 U	330 U	330 U	330 U
Aniline	330 U	330 U	330 U	330 U	330 U	330 U
Anthracene	330 U	330 U	330 U	330 U	330 U	330 U
Benzo(a)Anthracene	330 U	330 U	330 U	330 U	330 U	330 U
Benzo(b)Fluoranthene	330 U	330 U	330 U	330 U	330 U	330 U
Benzo(k)Fluoranthene	330 U	330 U	330 U	330 U	330 U	330 U
Benzo(a)Pyrene	330 U	330 U	330 U	330 U	330 U	330 U
Benzoic Acid	1600 U	1600 U	1600 U	1600 U	1600 U	1600 U
Benzo(g,h,i)Perylene	330 U	330 U	330 U	330 U	330 U	330 U
Benzy alcohol	330 U	330 U	330 U	330 U	330 U	330 U
4-Bromophenylphenyl ether	330 U	330 U	330 U	330 U	330 U	330 U
Butylbenzylphthalate	330 U	330 U	330 U	330 U	330 U	330 U
di-n-Butyl phthalate	330 U	330 U	330 U	330 U	330 U	330 U
Carbazole	330 U	330 U	330 U	330 U	330 U	330 U
4-Chloroaniline	330 U	330 U	330 U	330 U	330 U	330 U
bis(2-Chloroethoxy)Methane	330 U	330 U	330 U	330 U	330 U	330 U
bis(2-Chloroethyl)Ether	330 U	330 U	330 U	330 U	330 U	330 U
bis(2-Chloroisopropyl)Ether	330 U	330 U	330 U	330 U	330 U	330 U
4-Chloro-3-Methylphenol	330 U	330 U	330 U	330 U	330 U	330 U
2-Chloronaphthalene	330 U	330 U	330 U	330 U	330 U	330 U
2-Chlorophenol	330 U	330 U	330 U	330 U	330 U	330 U
4-Chlorophenylphenyl ether	330 U	330 U	330 U	330 U	330 U	330 U
Chrysene	330 U	330 U	330 U	330 U	330 U	330 U
Dibenz(a,h)Anthracene	330 U	330 U	330 U	330 U	330 U	330 U
Dibenzofuran	330 U	330 U	330 U	330 U	330 U	330 U
1,2-Dichlorobenzene	330 U	330 U	330 U	330 U	330 U	330 U
1,3-Dichlorobenzene	330 U	330 U	330 U	330 U	330 U	330 U
1,4-Dichlorobenzene	330 U	330 U	330 U	330 U	330 U	330 U
3,3'-Dichlorobenzidine	330 U	330 U	330 U	330 U	330 U	330 U
2,4-Dichlorophenol	330 U	330 U	330 U	330 U	330 U	330 U
Diethylphthalate	330 U	330 U	330 U	330 U	330 U	330 U
2,4-Dimethylphenol	330 U	330 U	330 U	330 U	330 U	330 U
Dimethyl Phthalate	330 U	330 U	330 U	330 U	330 U	330 U

BH - Borehole

SVOC - Semivolatile Organic Compounds

U - Indicates compound was analyzed for but not detected

# **Appendix K.2** **Semivolatile Soil Analytical Results for Site No. 25** **Duluth Air National Guard Base, Duluth, Minnesota** (Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-001BH 6.5-7	025-002BH 11.5-12	025-003BH 11-12	025-003BH 11-12 Dup	025-004BH 11.5-12	025-004BH 19.5-20
Sample Date:	05/15/95	05/15/95	05/15/95	05/15/95	05/16/95	05/16/95
Lab Sample No.:	9505556-02	9505556-03	9505556-04	9505556-05	9505612-05	9505612-06
SVOCs	Matrix	Soil	Soil	Soil	Soil	Soil
4,6-Dinitro-2-Methylphenol	800 U	800 U	800 U	800 U	800 U	800 U
2,4-Dinitrophenol	800 U	800 U	800 U	800 U	800 U	800 U
2,4-Dinitrotoluene	330 U	330 U	330 U	330 U	330 U	330 U
2,6-Dinitrotoluene	330 U	330 U	330 U	330 U	330 U	330 U
1,2-Diphenylhydrazine	330 U	330 U	330 U	330 U	330 U	330 U
bis(2-Ethylhexyl)Phthalate	330 U	330 U	330 U	330 U	330 U	330 U
Fluoranthene	330 U	330 U	330 U	330 U	330 U	330 U
Fluorene	330 U	330 U	330 U	330 U	330 U	330 U
Hexachlorobenzene	330 U	330 U	330 U	330 U	330 U	330 U
Hexachlorobutadiene	330 U	330 U	330 U	330 U	330 U	330 U
Hexachloroethane	330 U	330 U	330 U	330 U	330 U	330 U
Hexachlorocyclopentadiene	330 U	330 U	330 U	330 U	330 U	330 U
Indeno(1,2,3-cd)Pyrene	330 U	330 U	330 U	330 U	330 U	330 U
Isophorone	330 U	330 U	330 U	330 U	330 U	330 U
2-Methylnaphthalene	12000	2300	330 U	330	330 U	330 U
2-Methylphenol	330 U	330 U	330 U	330 U	330 U	330 U
4-Methylphenol	330 U	330 U	330 U	330 U	330 U	330 U
Naphthalene	14000	2100	330 U	330 U	330 U	330 U
2-Nitroaniline	800 U	800 U	800 U	800 U	800 U	800 U
3-Nitroaniline	800 U	800 U	800 U	800 U	800 U	800 U
4-Nitroaniline	800 U	800 U	800 U	800 U	800 U	800 U
Nitrobenzene	330 U	330 U	330 U	330 U	330 U	330 U
2-Nitrophenol	330 U	330 U	330 U	330 U	330 U	330 U
4-Nitrophenol	800 U	800 U	800 U	800 U	800 U	800 U
N-Nitrosodiphenylamine (1)	330 U	330 U	330 U	330 U	330 U	330 U
N-Nitroso-Di-n-Propylamine	330 U	330 U	330 U	330 U	330 U	330 U
Di-n-Octyl Phthalate	330 U	330 U	330 U	330 U	330 U	330 U
Pentachlorophenol	800 U	800 U	800 U	800 U	800 U	800 U
Phenanthrene	330 U	330 U	330 U	330 U	330 U	330 U
Phenol	350	330 U	330 U	330 U	330 U	330 U
Pyrene	330 U	330 U	330 U	330 U	330 U	330 U
Pyridine	330 U	330 U	330 U	330 U	330 U	330 U
1,2,4-Trichlorobenzene	330 U	330 U	330 U	330 U	330 U	330 U
2,4,5-Trichlorophenol	800 U	800 U	800 U	800 U	800 U	800 U
2,4,6-Trichlorophenol	330 U	330 U	330 U	330 U	330 U	330 U

BH - Borehole  
SVOC - Semivolatile Organic Compounds

U - Indicates compound was analyzed for but not detected

# Semivolatle Soil Analytical Results for Site No. 25

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-005BH 11.5-12	025-006BH 21.5-22	025-07BH 11.5-12	025-008BH 10.5-11.0	025-008BH 14.5-15.0	025-009BH 11-12
Sample Date:	05/16/95	05/12/95	05/16/95	05/12/95	05/12/95	05/12/95
Lab Sample No.:	9505612-04	9505512-08	9505612-03	9505512-02	9505512-03	9505512-10
SVOCs	Soil	Soil	Soil	Soil	Soil	Soil
Matrix						
Acenaphthene	330 U	990 U	330 U	330 U	330 U	330 U
Acenaphthylene	330 U	990 U	330 U	330 U	330 U	330 U
Aniline	330 U	990 U	330 U	330 U	330 U	330 U
Anthracene	330 U	990 U	330 U	330 U	330 U	330 U
Benzo(a)Anthracene	330 U	990 U	330 U	330 U	330 U	330 U
Benzo(b)Fluoranthene	330 U	990 U	330 U	330 U	330 U	330 U
Benzo(k)Fluoranthene	330 U	990 U	330 U	330 U	330 U	330 U
Benzo(a)Pyrene	330 U	990 U	330 U	330 U	330 U	330 U
Benzoic Acid	1600 U	4800 U	1600 U	1600 U	1600 U	1600 U
Benzo(g,h,i)Perylene	330 U	990 U	330 U	330 U	330 U	330 U
Benzyl alcohol	330 U	990 U	330 U	330 U	330 U	330 U
4-Bromophenylphenyl ether	330 U	990 U	330 U	330 U	330 U	330 U
Butylbenzylphthalate	330 U	990 U	330 U	330 U	330 U	330 U
di-n-Butyl phthalate	330 U	990 U	330 U	330 U	330 U	330 U
Carbazole	330 U	990 U	330 U	330 U	330 U	330 U
4-Chloroaniline	330 U	990 U	330 U	330 U	330 U	330 U
bis(2-Chloroethoxy)Methane	330 U	990 U	330 U	330 U	330 U	330 U
bis(2-Chloroethyl)Ether	330 U	990 U	330 U	330 U	330 U	330 U
bis(2-Chloroisopropyl)Ether	330 U	990 U	330 U	330 U	330 U	330 U
4-Chloro-3-Methylphenol	330 U	990 U	330 U	330 U	330 U	330 U
2-Chloronaphthalene	330 U	990 U	330 U	330 U	330 U	330 U
2-Chlorophenol	330 U	990 U	330 U	330 U	330 U	330 U
4-Chlorophenylphenyl ether	330 U	990 U	330 U	330 U	330 U	330 U
Chrysene	330 U	990 U	330 U	330 U	330 U	330 U
Dibenz(a,h)Anthracene	330 U	990 U	330 U	330 U	330 U	330 U
Dibenzofuran	330 U	990 U	330 U	330 U	330 U	330 U
1,2-Dichlorobenzene	330 U	990 U	330 U	330 U	330 U	330 U
1,3-Dichlorobenzene	330 U	990 U	330 U	330 U	330 U	330 U
1,4-Dichlorobenzene	330 U	990 U	330 U	330 U	330 U	330 U
3,3'-Dichlorobenzidine	330 U	990 U	330 U	330 U	330 U	330 U
2,4-Dichlorophenol	330 U	990 U	330 U	330 U	330 U	330 U
Diethylphthalate	330 U	990 U	330 U	330 U	330 U	330 U
2,4-Dimethylphenol	330 U	990 U	330 U	330 U	330 U	330 U
Dimethyl Phthalate	330 U	990 U	330 U	330 U	330 U	330 U

BH - Borehole  
SVOC - Semivolatle Organic Compounds

U - Indicates compound was analyzed for but not detected

# Appendix K.2 Semivolatile Soil Analytical Results for Site No. 25 Duluth Air National Guard Base, Duluth, Minnesota (Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-005BH 11.5-12	025-006BH 21.5-22	025-07BH 11.5-12	025-008BH 10.5-11.0	025-008BH 14.5-15.0	025-009BH 11-12
Sample Date:	05/16/95	05/12/95	05/16/95	05/12/95	05/12/95	05/12/95
Lab Sample No.:	9505612-04	9505512-08	9505612-03	9505512-02	9505512-03	9505512-10
SVOCs	Matrix	Soil	Soil	Soil	Soil	Soil
4,6-Dinitro-2-Methylphenol	800 U	2400 U	800 U	800 U	800 U	800 U
2,4-Dinitrophenol	800 U	2400 U	800 U	800 U	800 U	800 U
2,4-Dinitrotoluene	330 U	990 U	330 U	330 U	330 U	330 U
2,6-Dinitrotoluene	330 U	990 U	330 U	330 U	330 U	330 U
1,2-Diphenylhydrazine	330 U	990 U	330 U	330 U	330 U	330 U
bis(2-Ethylhexyl)Phthalate	330 U	990 U	330 U	330 U	330 U	330 U
Fluoranthene	330 U	990 U	330 U	330 U	330 U	330 U
Fluorene	330 U	990 U	330 U	330 U	330 U	330 U
Hexachlorobenzene	330 U	990 U	330 U	330 U	330 U	330 U
Hexachlorobutadiene	330 U	990 U	330 U	330 U	330 U	330 U
Hexachloroethane	330 U	990 U	330 U	330 U	330 U	330 U
Hexachlorocyclopentadiene	330 U	990 U	330 U	330 U	330 U	330 U
Indeno(1,2,3-cd)Pyrene	330 U	990 U	330 U	330 U	330 U	330 U
Isophorone	330 U	990 U	330 U	330 U	330 U	330 U
2-Methylnaphthalene	330 U	990 U	330 U	330 U	330 U	330 U
2-Methylphenol	330 U	990 U	330 U	330 U	330 U	330 U
4-Methylphenol	330 U	990 U	330 U	330 U	330 U	330 U
Naphthalene	330 U	990 U	330 U	330 U	330 U	330 U
2-Nitroaniline	800 U	2400 U	800 U	800 U	800 U	800 U
3-Nitroaniline	800 U	2400 U	800 U	800 U	800 U	800 U
4-Nitroaniline	800 U	2400 U	800 U	800 U	800 U	800 U
Nitrobenzene	330 U	990 U	330 U	330 U	330 U	330 U
2-Nitrophenol	330 U	990 U	330 U	330 U	330 U	330 U
4-Nitrophenol	800 U	2400 U	800 U	800 U	800 U	800 U
N-Nitrosodiphenylamine (1)	330 U	990 U	330 U	330 U	330 U	330 U
N-Nitroso-Di-n-Propylamine	330 U	990 U	330 U	330 U	330 U	330 U
Di-n-Octyl Phthalate	330 U	990 U	330 U	330 U	330 U	330 U
Pentachlorophenol	800 U	2400 U	800 U	800 U	800 U	800 U
Phenanthrene	330 U	990 U	330 U	330 U	330 U	330 U
Phenol	330 U	990 U	330 U	330 U	330 U	330 U
Pyrene	330 U	990 U	330 U	330 U	330 U	330 U
Pyridine	330 U	990 U	330 U	330 U	330 U	330 U
1,2,4-Trichlorobenzene	330 U	990 U	330 U	330 U	330 U	330 U
2,4,5-Trichlorophenol	800 U	2400 U	800 U	800 U	800 U	800 U
2,4,6-Trichlorophenol	330 U	990 U	330 U	330 U	330 U	330 U

BH - Borehole  
SVOC - Semivolatile Organic Compounds

U - Indicates compound was analyzed for but not detected

# Semivolatile Soil Analytical Results for Site No. 25 Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-009BH 11-12 Dup	025-010BH 14-14.5	025-010BH 2-2.5	025-010BH 6-6.5	025-011BH 2-2.5	025-011BH 6.5-7
Sample Date:	05/12/95	05/12/95	05/12/95	05/12/95	05/12/95	05/12/95
Lab Sample No.:	9505512-09	9505512-11	9505512-04	9505512-05	9505512-06	9505512-07
SVOCs	Soil	Soil	Soil	Soil	Soil	Soil
Matrix						
Acenaphthene	330 U	330 U	330 U	330 U	330 U	3300 U
Acenaphthylene	330 U	330 U	330 U	330 U	330 U	3300 U
Aniline	330 U	330 U	330 U	330 U	330 U	3300 U
Anthracene	330 U	330 U	330 U	330 U	330 U	3300 U
Benzo(a)Anthracene	330 U	330 U	330 U	330 U	330 U	3300 U
Benzo(b)Fluoranthene	330 U	330 U	330 U	330 U	330 U	3300 U
Benzo(k)Fluoranthene	330 U	330 U	330 U	330 U	330 U	3300 U
Benzo(a)Pyrene	330 U	330 U	330 U	330 U	330 U	3300 U
Benzoic Acid	1600 U	1600 U	1600 U	1600 U	1600 U	16000 U
Benzo(g,h,i)Perylene	330 U	330 U	330 U	330 U	330 U	3300 U
Benzyl alcohol	330 U	330 U	330 U	330 U	330 U	3300 U
4-Erinophenylphenyl ether	330 U	330 U	330 U	330 U	330 U	3300 U
Butylbenzylphthalate	330 U	330 U	330 U	330 U	330 U	3300 U
di-n-Butyl phthalate	330 U	330 U	330 U	330 U	330 U	3300 U
Carbazole	330 U	330 U	330 U	330 U	330 U	3300 U
4-Chloroaniline	330 U	330 U	330 U	330 U	330 U	3300 U
bis(2-Chloroethoxy)Methane	330 U	330 U	330 U	330 U	330 U	3300 U
bis(2-Chloroethyl)Ether	330 U	330 U	330 U	330 U	330 U	3300 U
bis(2-Chloroisopropyl)Ether	330 U	330 U	330 U	330 U	330 U	3300 U
4-Chloro-3-Methylphenol	330 U	330 U	330 U	330 U	330 U	3300 U
2-Chloronaphthalene	330 U	330 U	330 U	330 U	330 U	3300 U
2-Chlorophenol	330 U	330 U	330 U	330 U	330 U	3300 U
4-Chlorophenylphenyl ether	330 U	330 U	330 U	330 U	330 U	3300 U
Chrysene	330 U	330 U	330 U	330 U	330 U	3300 U
Dibenz(a,h)Anthracene	330 U	330 U	330 U	330 U	330 U	3300 U
Dibenzofuran	330 U	330 U	330 U	330 U	330 U	3300 U
1,2-Dichlorobenzene	330 U	330 U	330 U	330 U	330 U	3300 U
1,3-Dichlorobenzene	330 U	330 U	330 U	330 U	330 U	3300 U
1,4-Dichlorobenzene	330 U	330 U	330 U	330 U	330 U	3300 U
3,3'-Dichlorobenzidine	330 U	330 U	330 U	330 U	330 U	3300 U
2,4-Dichlorophenol	330 U	330 U	330 U	330 U	330 U	3300 U
Diethylphthalate	330 U	330 U	330 U	330 U	330 U	3300 U
2,4-Dimethylphenol	330 U	330 U	330 U	330 U	330 U	3300 U
Dimethyl Phthalate	330 U	330 U	330 U	330 U	330 U	3300 U

BH - Borehole

SVOC - Semivolatile Organic Compounds

U - Indicates compound was analyzed for but not detected

**Appendix K.2**  
**Semivolatile Soil Analytical Results for Site No. 25**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in micrograms per kilogram unless otherwise noted)

Location No.	025-009BH 11-12 Dup	025-009BH 14-14.5	025-010BH 2-2.5	025-010BH 6-6.5	025-011BH 2-2.5	025-011BH 6.5-7
Sample Date:	05/12/95	05/12/95	05/12/95	05/12/95	05/12/95	05/12/95
Lab Sample No.:	9505512-09	9505512-11	9505512-04	9505512-05	9505512-06	9505512-07
SVOCs	Matrix	Soil	Soil	Soil	Soil	Soil
4,6-Dinitro-2-Methylphenol	800 U	800 U	800 U	800 U	800 U	8000 U
2,4-Dinitrophenol	800 U	800 U	800 U	800 U	800 U	8000 U
2,4-Dinitrotoluene	330 U	330 U	330 U	330 U	330 U	3300 U
2,6-Dinitrotoluene	330 U	330 U	330 U	330 U	330 U	3300 U
1,2-Diphenylhydrazine	330 U	330 U	330 U	330 U	330 U	3300 U
bis(2-Ethylhexyl)Phthalate	330 U	330 U	330 U	330 U	330 U	3300 U
Fluoranthene	330 U	330 U	420	330 U	330 U	3300 U
Fluorene	330 U	330 U	330 U	330 U	330 U	3300 U
Hexachlorobenzene	330 U	330 U	330 U	330 U	330 U	3300 U
Hexachlorobutadiene	330 U	330 U	330 U	330 U	330 U	3300 U
Hexachloroethane	330 U	330 U	330 U	330 U	330 U	3300 U
Hexachlorocyclopentadiene	330 U	330 U	330 U	330 U	330 U	3300 U
Indeno(1,2,3-cd)Pyrene	330 U	330 U	330 U	330 U	330 U	3300 U
Isophorone	330 U	330 U	330 U	330 U	330 U	3300 U
2-Methylnaphthalene	330 U	330 U	330 U	330 U	330 U	3300 U
2-Methylphenol	330 U	330 U	330 U	330 U	330 U	3300 U
4-Methylphenol	330 U	330 U	330 U	330 U	330 U	3300 U
Naphthalene	330 U	330 U	330 U	330 U	330 U	3300 U
2-Nitroaniline	800 U	800 U	800 U	800 U	800 U	8000 U
3-Nitroaniline	800 U	800 U	800 U	800 U	800 U	8000 U
4-Nitroaniline	800 U	800 U	800 U	800 U	800 U	8000 U
Nitrobenzene	330 U	330 U	330 U	330 U	330 U	3300 U
2-Nitrophenol	330 U	330 U	330 U	330 U	330 U	3300 U
4-Nitrophenol	800 U	800 U	800 U	800 U	800 U	8000 U
N-Nitrosodiphenylamine (1)	330 U	330 U	330 U	330 U	330 U	3300 U
N-Nitroso-Di-n-Propylamine	330 U	330 U	330 U	330 U	330 U	3300 U
Di-n-Octyl Phthalate	330 U	330 U	330 U	330 U	330 U	3300 U
Pentachlorophenol	800 U	800 U	800 U	800 U	800 U	8000 U
Phenanthrene	330 U	330 U	330 U	330 U	330 U	3300 U
Phenol	330 U	330 U	330 U	330 U	330 U	3300 U
Pyrene	330 U	330 U	360	330 U	330 U	3300 U
Pyridine	330 U	330 U	330 U	330 U	330 U	3300 U
1,2,4-Trichlorobenzene	330 U	330 U	330 U	330 U	330 U	3300 U
2,4,5-Trichlorophenol	800 U	800 U	800 U	800 U	800 U	8000 U
2,4,6-Trichlorophenol	330 U	330 U	330 U	330 U	330 U	3300 U

BH - Borehole

SVOC - Semivolatile Organic Compounds

U - Indicates compound was analyzed for but not detected

**Semivolatile Soil Analytical Results for Site No. 25**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in micrograms per kilogram unless otherwise noted)

Location No.	025-012BH 11.5-12	025-012BH 19.5-20	025-013BH 11.5-12
Sample Date:	5/17/95	5/17/95	5/17/95
Lab Sample No.:	9505673-02	9505673-03	9505673-04
SVOCs	Matrix	Soil	Soil
Acenaphthene	330 U	330 U	330 U
Acenaphthylene	330 U	330 U	330 U
Aniline	330 U	330 U	330 U
Anthracene	330 U	330 U	330 U
Benzo(a)Anthracene	330 U	330 U	330 U
Benzo(b)Fluoranthene	330 U	330 U	330 U
Benzo(k)Fluoranthene	330 U	330 U	330 U
Benzo(a)Pyrene	330 U	330 U	330 U
Benzoic Acid	1600 U	1600 U	1600 U
Benzo(g,h,i)Perylene	330 U	330 U	330 U
Benzyl alcohol	330 U	330 U	330 U
4-Bromophenylphenyl ether	330 U	330 U	330 U
Butylbenzylphthalate	330 U	330 U	330 U
di-n-Butyl phthalate	330 U	330 U	330 U
Carbazole	330 U	330 U	330 U
4-Chloroaniline	330 U	330 U	330 U
bis(2-Chloroethoxy)Methane	330 U	330 U	330 U
bis(2-Chloroethyl)Ether	330 U	330 U	330 U
bis(2-Chloroisopropyl)Ether	330 U	330 U	330 U
4-Chloro-3-Methylphenol	330 U	330 U	330 U
2-Chloronaphthalene	330 U	330 U	330 U
2-Chlorophenol	330 U	330 U	330 U
4-Chlorophenylphenyl ether	330 U	330 U	330 U
Chrysene	330 U	330 U	330 U
Dibenz(a,h)Anthracene	330 U	330 U	330 U
Dibenzofuran	330 U	330 U	330 U
1,2-Dichlorobenzene	330 U	330 U	330 U
1,3-Dichlorobenzene	330 U	330 U	330 U
1,4-Dichlorobenzene	330 U	330 U	330 U
3,3'-Dichlorobenzidine	330 U	330 U	330 U
2,4-Dichlorophenol	330 U	330 U	330 U
Diethylphthalate	330 U	330 U	330 U
2,4-Dimethylphenol	330 U	330 U	330 U
Dimethyl Phthalate	330 U	330 U	330 U

BH - Borehole  
 SVOC - Semivolatile Organic Compounds

U - Indicates compound was analyzed for but not detected



# Appendix K.2

## Semivolatile Soil Analytical Results for Site No. 25 Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-012BH 11:5-12	025-012BH 19:5-20	025-013BH 11:5-12
Sample Date:	5/17/95	5/17/95	5/17/95
Lab Sample No.:	9505673-02	9505673-03	9505673-04
SVOCs	Matrix	Soil	Soil
4,6-Dinitro-2-Methylphenol	800 U	800 U	800 U
2,4-Dinitrophenol	800 U	800 U	800 U
2,4-Dinitrotoluene	330 U	330 U	330 U
2,6-Dinitrotoluene	330 U	330 U	330 U
1,2-Diphenylhydrazine	330 U	330 U	330 U
bis(2-Ethylhexyl)Phthalate	330 U	330 U	330 U
Fluoranthene	330 U	330 U	330 U
Fluorene	330 U	330 U	330 U
Hexachlorobenzene	330 U	330 U	330 U
Hexachlorobutadiene	330 U	330 U	330 U
Hexachloroethane	330 U	330 U	330 U
Hexachlorocyclopentadiene	330 U	330 U	330 U
Indeno(1,2,3-cd)Pyrene	330 U	330 U	330 U
Isophorone	330 U	330 U	330 U
2-Methylnaphthalene	330 U	330 U	330 U
2-Methylphenol	330 U	330 U	330 U
4-Methylphenol	330 U	330 U	330 U
Naphthalene	330 U	330 U	330 U
2-Nitroaniline	800 U	800 U	800 U
3-Nitroaniline	800 U	800 U	800 U
4-Nitroaniline	800 U	800 U	800 U
Nitrobenzene	330 U	330 U	330 U
2-Nitrophenol	330 U	330 U	330 U
4-Nitrophenol	800 U	800 U	800 U
N-Nitrosodiphenylamine (1)	330 U	330 U	330 U
N-Nitroso-Di-n-Propylamine	330 U	330 U	330 U
Di-n-Octyl Phthalate	330 U	330 U	330 U
Pentachlorophenol	800 U	800 U	800 U
Phenanthrene	330 U	330 U	330 U
Phenol	330 U	330 U	330 U
Pyrene	330 U	330 U	330 U
Pyridine	330 U	330 U	330 U
1,2,4-Trichlorobenzene	330 U	330 U	330 U
2,4,5-Trichlorophenol	800 U	800 U	800 U
2,4,6-Trichlorophenol	330 U	330 U	330 U

**Appendix K.3**  
**Metals Soil Analytical Results for Site No.25**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in milligrams per kilogram unless otherwise noted)

Location No.:	025-001BH 6.5-7	025-002BH 11.5-12	025-003BH 11-12	025-003BH 11-12 Dup	025-004BH 11.5-12
Sample Date:	05/15/95	05/15/95	05/15/95	05/15/95	05/16/95
Lab Sample No.:	9505556-02	9505556-03	9505556-04	9505556-05	9505612-05
Metals	Matri	Soil	Soil	Soil	Soil
Mercury, Total	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium, Total	0.4 U	0.4 U	0.4 U	0.5	0.5 U
Chromium, Total	9	6	15	11	9
Nickel, Total	25	21	22	26	17
Lead, Total	3.2	1.7	3.0	2.6	2.0

Location No.:	025-004BH 19.5-20	025-005BH 11.5-12	025-006BH 21.5-22	025-007BH 11.5-12	025-008BH 10.5-11.0
Sample Date:	05/16/95	05/16/95	05/12/95	05/16/95	05/12/95
Lab Sample No.:	9505612-06	9505612-04	9505512-08	9505612-03	9505512-02
Metals	Matri	Soil	Soil	Soil	Soil
Mercury, Total	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium, Total	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chromium, Total	18	6	16	6	18
Nickel, Total	23	17	18	16	26
Lead, Total	4.5	1.9	7.6	6.1	4.6

BH - Borehole

U - Indicates element was analyzed for but not detected

**Appendix K.3**  
**Metals Soil Analytical Results for Site No.25**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in milligrams per kilogram unless otherwise noted)

<b>Location No.:</b>	025-008BH 14.5-15.0	025-009BH 11-12	025-009BH 11-12 Dup	025-009BH 14-14.5	025-010BH 2-2.5
<b>Sample Date:</b>	05/12/95	05/12/95	05/12/95	05/12/95	05/12/95
<b>Lab Sample No.:</b>	9505512-03	9505512-10	9505512-09	9505512-11	9505512-04
<b>Metals</b>	<b>Matri</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
Mercury, Total	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium, Total	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chromium, Total	12	18	24	17	15
Nickel, Total	27	19	22	18	20
Lead, Total	6.8	5.5	5.8	3.8	4.6

<b>Location No.:</b>	025-010BH 6-6.5	025-011BH 2-2.5	025-011BH 6.5-7	025-012BH 11.5-12	025-012BH 19.5-20
<b>Sample Date:</b>	05/12/95	05/12/95	5/12/95	5/17/95	5/17/95
<b>Lab Sample No.:</b>	9505512-05	9505512-06	9505512-07	9505673-02	9505673-03
<b>Metals</b>	<b>Matri</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
Mercury, Total	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Cadmium, Total	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chromium, Total	19	19	17	11	13
Nickel, Total	25	21	18	15	9
Lead, Total	3.6	5.2	6.3	4.3	5.3

Location No.:	025-013BH 11.5-12		
Sample Date:	5/17/95		
Lab Sample No.:	9505673-04		
Metals	Matri	Soil	
Mercury, Total		0.1 U	
Cadmium, Total		0.5 U	
Chromium, Total		6	
Nickel, Total		16	
Lead, Total		3.2	

**Appendix K.4**  
**Halogenated Volatile Groundwater Results for Site No. 25**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
(Result in micrograms per liter unless otherwise noted)

Location No.:	025-001MW-GW01	025-002MW-GW1	025-003MW-GW01	025-003MW-GW01 Dup
Sample Date:	05/19/95	05/18/95	05/19/95	05/19/95
Lab Sample No.:	9505767-03	9505714-08	9505767-05	9505767-06
VOC'S (8010)	Matrix	Water	Water	Water
Dichlorodifluoromethane		1U	1U	25 U
Chloromethane		1U	1U	25 U
Vinyl chloride		1U	1U	25 U
Bromomethane		1U	1U	25 U
Chloroethane		1U	1U	25 U
Trichlorofluoromethane		1U	1U	25 U
1,1-Dichloroethene		1U	1U	25 U
Methylene chloride		1U	1U	30
Trans-1,2-Dichloroethene		1U	1U	25 U
1,1-Dichloroethane		1U	1U	25 U
chloroform		1U	1U	25 U
1,1,1-Trichloroethane		1U	1U	25 U
carbon tetrachloride		1U	1U	25 U
1,2-Dichloroethane		1U	1U	25 U
2-Chloroethylvinyl ether		1U	1U	25 U
Trichloroethene		1U	1U	25 U
1,2-Dichloropropane		1U	1U	25 U
Bromodichloromethane		1U	1U	25 U
cis-1,3-Dichloropropene		1U	1U	25 U
trans-1,3-Dichloropropene		1U	1U	25 U
1,1,2-Trichloroethane		1U	1U	25 U
Tetrachloroethene		1U	1U	25 U
Dibromochloromethane		1U	1U	25 U
Chlorobenzene		1U	1U	25 U
Bromoform		1U	1U	25 U
1,1,2,2-Tetrachloroethane		1U	1U	25 U
1,3-Dichlorobenzene		1U	1U	25 U
1,4-Dichlorobenzene		1U	1U	25 U
1,2-Dichlorobenzene		1U	1U	25 U

MW - Monitoring Well  
GW - Groundwater

U - Indicates compound was analyzed for but not detected  
PAH-8010 - Polynuclear Aromatic Hydrocarbon Compounds

**Appendix K.4**  
**Aromatic Volatile Groundwater Results for Site No. 25**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in micrograms per liter unless otherwise noted)

Location No.:	025-001MW-GW01	025-002MW-GW1	025-003MW-GW01	025-003MW-GW01 Dup
Sample Date:	05/19/95	05/18/95	05/19/95	05/19/95
Lab Sample No.:	9505767-03	9505714-08	9505767-05	9505767-06
BTEX(8020)	Matri	Water	Water	Water
Benzene	1 U	1	2600	2300
Toluene	1 U	1 U	1300	1300
Ethylbenzene	1 U	1 U	570	540
Xylenes (total)	1 U	1 U	1450	1390

MW - Monitoring Well  
 GW - Groundwater

U - Indicates compound was analyzed for but not detected  
 BTEX 8020 - Volatile Organic Compounds-Method 8020

# Semivolatile Groundwater Analytical Results for Site No. 25

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per liter unless otherwise noted)

Location No.:	025-001MW-GW01	025-002MW-GW1	025-003MW-GW01	025-003MW-GW01 Dup
Sample Date:	05/19/95	05/18/95	05/19/95	05/19/95
Lab Sample No.:	9505767-03	9505714-08	9505767-05	9505767-06
SVOCs	Matrix	Water	Water	Water
Acenaphthene	5 U	5 U	5 U	5 U
Acenaphthylene	5 U	5 U	5 U	5 U
Aniline	5 U	5 U	5 U	5 U
Anthracene	5 U	5 U	5 U	5 U
Benzo(a)Anthracene	5 U	5 U	5 U	5 U
Benzo(b)Fluoranthene	5 U	5 U	5 U	5 U
Benzo(k)Fluoranthene	5 U	5 U	5 U	5 U
Benzo(a)Pyrene	5 U	5 U	5 U	5 U
Benzoic Acid	25 U	25 U	25 U	25 U
Benzo(g,h,i)Perylene	5 U	5 U	5 U	5 U
Benzyl alcohol	5 U	5 U	5 U	5 U
4-Bromophenylphenyl ether	5 U	5 U	5 U	5 U
Butylbenzylphthalate	5 U	5 U	5 U	5 U
di-n-Butyl phthalate	5 U	5 U	5 U	5 U
Carbazole	5 U	5 U	5 U	5 U
4-Chloroaniline	5 U	5 U	5 U	5 U
bis(2-Chloroethoxy)Methane	5 U	5 U	5 U	5 U
bis(2-Chloroethyl)Ether	5 U	5 U	5 U	5 U
bis(2-Chloroisopropyl)Ether	5 U	5 U	5 U	5 U
4-Chloro-3-Methylphenol	5 U	5 U	5 U	5 U
2-Chloronaphthalene	5 U	5 U	5 U	5 U
2-Chlorophenol	5 U	5 U	5 U	5 U
4-Chlorophenylphenyl ether	5 U	5 U	5 U	5 U
Chrysene	5 U	5 U	5 U	5 U
Dibenz(a,h)Anthracene	5 U	5 U	5 U	5 U
Dibenzofuran	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	5 U	5 U	5 U	5 U
3,3'-Dichlorobenzidine	5 U	5 U	5 U	5 U
2,4-Dichlorophenol	5 U	5 U	5 U	5 U
Diethylphthalate	5 U	5 U	5 U	5 U
2,4-Dimethylphenol	5 U	5 U	5 U	5 U
Dimethyl Phthalate	5 U	5 U	5 U	5 U
4,6-Dinitro-2-Methylphenol	25 U	25 U	25 U	25 U
2,4-Dinitrophenol	25 U	25 U	25 U	25 U

MW - Monitoring Well  
GW - Groundwater

U - Indicates compound was analyzed for but not detected  
SVOC - Semivolatile Organic Compounds

# Appendix K.5

## Semivolatile Groundwater Analytical Results for Site No. 25

### Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per liter unless otherwise noted)

Location No.:	025-001MW-GW01	025-002MW-GW1	025-003MW-GW01	025-003MW-GW01 Dup
Sample Date:	05/19/95	05/18/95	05/19/95	05/19/95
Lab Sample No.:	9505767-03	9505714-08	9505767-05	9505767-06
SVOCs	Matrix	Water	Water	Water
2,4-Dinitrotoluene		5 U	5 U	5 U
2,6-Dinitrotoluene		5 U	5 U	5 U
1,2-Diphenylhydrazine		5 U	5 U	5 U
bis(2-Ethylhexyl)Phthalate		5 U	5 U	5 U
Fluoranthene		5 U	5 U	5 U
Fluorene		5 U	5 U	5 U
Hexachlorobenzene		5 U	5 U	5 U
Hexachlorobutadiene		5 U	5 U	5 U
Hexachloroethane		5 U	5 U	5 U
Hexachlorocyclopentadiene		5 U	5 U	5 U
Indeno(1,2,3-cd)Pyrene		5 U	5 U	5 U
Isophorone		5 U	5 U	5 U
2-Methylnaphthalene		5 U	11	8
2-Methylphenol		5 U	5 U	5 U
4-Methylphenol		5 U	9	8
Naphthalene		5 U	75	51
2-Nitroaniline		25 U	25 U	25 U
3-Nitroaniline		25 U	25 U	25 U
4-Nitroaniline		25 U	25 U	25 U
Nitrobenzene		5 U	5 U	5 U
2-Nitrophenol		25 U	25 U	25 U
4-Nitrophenol		25 U	25 U	25 U
N-Nitrosodiphenylamine (1)		5 U	5 U	5 U
N-Nitroso-Di-n-Propylamine		5 U	5 U	5 U
Di-n-Octyl Phthalate		5 U	5 U	5 U
Pentachlorophenol		25 U	25 U	25 U
Phenanthrene		5 U	5 U	5 U
Phenol		51	15	12
Pyrene		5 U	5 U	5 U
Pyridine		5 U	5 U	5 U
1,2,4-Trichlorobenzene		5 U	5 U	5 U
2,4,5-Trichlorophenol		10 U	10 U	10 U
2,4,6-Trichlorophenol		5 U	5 U	5 U

# Appendix K.6

## Metals Groundwater Analytical Results for Site No. 25 Duluth Air National Guard Base, Duluth, Minnesota (Results in milligrams per liter unless otherwise noted)

Location No.:	025-001MW-GW01	025-002MW-GW1	025-003MW-GW01	025-003MW-GW01 Dup
Sample Date:	05/19/95	05/18/95	05/19/95	05/19/95
Lab Sample No.:	9505767-03	9505174-08	9505767-05	9505767-06
Metals	Matri	Water	Water	Water
Mercury, Total	0.0004 U	0.0004 U	0.0004 U	0.0004 U
Cadmium, Total	0.005 U	0.005 U	0.005 U	0.005 U
Chromium, Total	0.036	0.011	0.015	0.019
Nickel, Total	0.07	0.03	0.03	0.04
Lead, Total	0.008	0.004 U	0.005	0.007

MW - Monitoring Well  
GW - Groundwater

U - Indicates element was analyzed for but not detected



# Appendix K.7

## Volatle Soil Analytical Results for Site No. 26 Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	026-001BH 2-2.5	026-001BH 9.5-10	026-001BH 9.5-10 Dup	026-002BH 2-2.5	026-002BH 6.5-7	026-003BH 15-2.5
Sample Date:	05/03/95	05/03/95	05/03/95	05/04/95	05/04/95	05/04/95
Lab Sample No.:	9505164-01	9505164-02	9505164-10	9505209-04	9505209-05	9505209-02
VOCs	Matrix	Soil	Soil	Soil	Soil	Soil
Acetone		100 U	100 U	100 U	100 U	100 U
Benzene		5 U	5 U	5 U	5 U	5 U
Bromodichloromethane		5 U	5 U	5 U	5 U	5 U
Bromoform		5 U	5 U	5 U	5 U	5 U
Bromomethane		10 U	10 U	10 U	10 U	10 U
2-Butanone		20 U	20 U	20 U	20 U	20 U
Carbon Disulfide		5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride		5 U	5 U	5 U	5 U	5 U
Chlorobenzene		5 U	5 U	5 U	5 U	5 U
Chloroethane		10 U	10 U	10 U	10 U	10 U
2-Chloroethylvinylether		10 U	10 U	10 U	10 U	10 U
Chloroform		5 U	5 U	5 U	5 U	5 U
Chloromethane		10 U	10 U	10 U	10 U	10 U
Dibromochloromethane		5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane		5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene		5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane		5 U	5 U	5 U	5 U	5 U
total-1,2-Dichloroethene		5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane		5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene		5 U	5 U	5 U	5 U	5 U
Ethylbenzene		5 U	5 U	5 U	5 U	5 U
2-Hexanone		10 U	10 U	10 U	10 U	10 U
Methylene Chloride		5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone		10 U	10 U	10 U	10 U	10 U
Styrene		5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane		5 U	5 U	5 U	5 U	5 U
Tetrachloroethene		5 U	5 U	5 U	5 U	5 U
Toluene		5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane		5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane		5 U	5 U	5 U	5 U	5 U
Trichloroethene		5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane		5 U	5 U	5 U	5 U	5 U
Vinyl Acetate		10 U	10 U	10 U	10 U	10 U
Vinyl Chloride		10 U	10 U	10 U	10 U	10 U
Xylenes (total)		5 U	5 U	5 U	5 U	5 U

# **Volatile Soil Analytical Results for Site No. 26** **Duluth Air National Guard Base, Duluth, Minnesota**

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	026-003BH 1.5-2.5 Dup	026-003BH 6.5-7	026-004BH 2-2.5	026-004BH 9.5-10	026-005BH 1.5-2.5	026-005BH 1.5-2.5 Dup
Sample Date:	05/04/95	05/04/95	05/03/95	05/03/95	05/03/95	05/03/95
Lab Sample No.:	9505209-01	9505209-03	9505164-03	9505164-04	9505164-05	9505164-09
VOCs	Matrix	Soil	Soil	Soil	Soil	Soil
Acetone	100 U	100 U	100 U	100 U	100 U	100 U
Benzene	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	20 U	20 U	20 U	20 U	20 U	20 U
Carbon Disulfide	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloroethylvinylether	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
total-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U	5 U	7
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U
Xylenes (total)	5 U	5 U	5 U	5 U	5 U	5 U

BH - Borehole

VOC - Volatile Organic Compounds

U - Indicates compound was analyzed for but not detected

# Appendix K.7

## Volatile Soil Analytical Results for Site No. 26

### Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	026-005BH 9.5-10	026-006BH 2-2.5	026-006BH 11.5-12
Sample Date:	05/03/95	05/03/95	05/03/95
Lab Sample No.:	9505164-06	9505164-08	9505164-07
VOCs	Matrix	Soil	Soil
Acetone	100 U	100 U	100 U
Benzene	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U
2-Butanone	20 U	20 U	20 U
Carbon Disulfide	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U
2-Chloroethylvinylether	10 U	10 U	10 U
Chloroform	5 U	5 U	5 U
Chloromethane	10 U	10 U	10 U
Dibromochloromethane	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U
total-1,2-Dichloroethene	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U
2-Hexanone	10 U	10 U	10 U
Methylene Chloride	5 U	5 U	5 U
4-Methyl-2-Pentanone	10 U	10 U	10 U
Styrene	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U
Toluene	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U
Trichlorofluoromethane	5 U	5 U	5 U
Vinyl Acetate	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U
Xylenes (total)	5 U	5 U	5 U

**Semivolatile Soil Analytical Results for Site No. 26**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in micrograms per kilogram unless otherwise noted)

Location No.:	026-001BH 2-2.5	026-001BH 9.5-10	026-001BH 9.5-10 Dup	026-002BH 2-2.5	026-002BH 6.5-7	026-003BH 1.5-2.5
Sample Date:	05/03/95	05/03/95	05/03/95	05/04/95	05/04/95	05/04/95
Lab Sample No.:	9505164-01	9505164-02	9505164-10	9505209-04	9505209-05	9505209-02
SVOCs	Matrix	Soil	Soil	Soil	Soil	Soil
Acenaphthene	330 U	330 U	330 U	330 U	330 U	330 U
Acenaphthylene	330 U	330 U	330 U	330 U	330 U	330 U
Aniline	330 U	330 U	330 U	330 U	330 U	330 U
Anthracene	330 U	330 U	330 U	330 U	330 U	330 U
Benzo(a)Anthracene	330 U	330 U	330 U	330 U	330 U	330 U
Benzo(b)Fluoranthene	330 U	330 U	330 U	330 U	330 U	330 U
Benzo(k)Fluoranthene	330 U	330 U	330 U	330 U	330 U	330 U
Benzo(a)Pyrene	330 U	330 U	330 U	330 U	330 U	330 U
Benzoic Acid	1600 U	1600 U	1600 U	1600 U	1600 U	1600 U
Benzo(g,h,i)Perylene	330 U	330 U	330 U	330 U	330 U	330 U
Benzyl alcohol	330 U	330 U	330 U	330 U	330 U	330 U
4-Bromophenylphenyl ether	330 U	330 U	330 U	330 U	330 U	330 U
Butylbenzylphthalate	330 U	330 U	330 U	330 U	330 U	330 U
di-n-Butyl phthalate	330 U	330 U	330 U	330 U	330 U	330 U
Carbazole	330 U	330 U	330 U	330 U	330 U	330 U
4-Chloroaniline	330 U	330 U	330 U	330 U	330 U	330 U
bis(2-Chloroethoxy)Methane	330 U	330 U	330 U	330 U	330 U	330 U
bis(2-Chloroethyl)Ether	330 U	330 U	330 U	330 U	330 U	330 U
bis(2-Chloroisopropyl)Ether	330 U	330 U	330 U	330 U	330 U	330 U
4-Chloro-3-Methylphenol	330 U	330 U	330 U	330 U	330 U	330 U
2-Chloronaphthalene	330 U	330 U	330 U	330 U	330 U	330 U
2-Chlorophenol	330 U	330 U	330 U	330 U	330 U	330 U
4-Chlorophenylphenyl ether	330 U	330 U	330 U	330 U	330 U	330 U
Chrysene	330 U	330 U	330 U	330 U	330 U	330 U
Dibenz(a,h)Anthracene	330 U	330 U	330 U	330 U	330 U	330 U
Dibenzofuran	330 U	330 U	330 U	330 U	330 U	330 U
1,2-Dichlorobenzene	330 U	330 U	330 U	330 U	330 U	330 U
1,3-Dichlorobenzene	330 U	330 U	330 U	330 U	330 U	330 U
1,4-Dichlorobenzene	330 U	330 U	330 U	330 U	330 U	330 U
3,3'-Dichlorobenzidine	330 U	330 U	330 U	330 U	330 U	330 U
2,4-Dichlorophenol	330 U	330 U	330 U	330 U	330 U	330 U
Diethylphthalate	330 U	330 U	330 U	330 U	330 U	330 U
2,4-Dimethylphenol	330 U	330 U	330 U	330 U	330 U	330 U
Dimethyl Phthalate	330 U	330 U	330 U	330 U	330 U	330 U

BH - Borehole

SVOC - Semivolatile Organic Compounds

U - Indicates compound was analyzed for but not detected

**Appendix K.8**  
**Semivolatile Soil Analytical Results for Site No. 26**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
(Results in micrograms per kilogram unless otherwise noted)

Location No.:	026-001BH 2-2.5	026-001BH 9.5-10	026-001BH 9.5-10 Dup	026-002BH 2-2.5	026-002BH 6.5-7	026-003BH 13-2.5
Sample Date:	05/03/95	05/03/95	05/03/95	05/04/95	05/04/95	05/04/95
Lab Sample No.:	9505164-01	9505164-02	9505164-10	9505209-04	9505209-05	9505209-02
SVOCs	Matrix	Soil	Soil	Soil	Soil	Soil
4,6-Dinitro-2-Methylphenol	800 U	800 U	800 U	800 U	800 U	800 U
2,4-Dinitrophenol	800 U	800 U	800 U	800 U	800 U	800 U
2,4-Dinitrotoluene	330 U	330 U	330 U	330 U	330 U	330 U
2,6-Dinitrotoluene	330 U	330 U	330 U	330 U	330 U	330 U
1,2-Diphenylhydrazine	330 U	330 U	330 U	330 U	330 U	330 U
bis(2-Ethylhexyl)Phthalate	330 U	330 U	330 U	330 U	330 U	330 U
Fluoranthene	330 U	330 U	330 U	330 U	330 U	330 U
Fluorene	330 U	330 U	330 U	330 U	330 U	330 U
1-Hexachlorobenzene	330 U	330 U	330 U	330 U	330 U	330 U
Hexachlorobutadiene	330 U	330 U	330 U	330 U	330 U	330 U
Hexachloroethane	330 U	330 U	330 U	330 U	330 U	330 U
Hexachlorocyclopentadiene	330 U	330 U	330 U	330 U	330 U	330 U
Indeno(1,2,3-cd)Pyrene	330 U	330 U	330 U	330 U	330 U	330 U
Isophorone	330 U	330 U	330 U	330 U	330 U	330 U
2-Methylnaphthalene	330 U	330 U	330 U	330 U	330 U	330 U
2-Methylphenol	330 U	330 U	330 U	330 U	330 U	330 U
4-Methylphenol	330 U	330 U	330 U	330 U	330 U	330 U
Naphthalene	330 U	330 U	330 U	330 U	330 U	330 U
2-Nitroaniline	800 U	800 U	800 U	800 U	800 U	800 U
3-Nitroaniline	800 U	800 U	800 U	800 U	800 U	800 U
4-Nitroaniline	800 U	800 U	800 U	800 U	800 U	800 U
Nitrobenzene	330 U	330 U	330 U	330 U	330 U	330 U
2-Nitrophenol	330 U	330 U	330 U	330 U	330 U	330 U
4-Nitrophenol	800 U	800 U	800 U	800 U	800 U	800 U
N-Nitrosodiphenylamine (1)	330 U	330 U	330 U	330 U	330 U	330 U
N-Nitroso-Di-n-Propylamine	330 U	330 U	330 U	330 U	330 U	330 U
Di-n-Octyl Phthalate	330 U	330 U	330 U	330 U	330 U	330 U
Pentachlorophenol	800 U	800 U	800 U	800 U	800 U	800 U
Phenanthrene	330 U	330 U	330 U	330 U	330 U	330 U
Phenol	330 U	330 U	330 U	330 U	330 U	330 U
Pyrene	330 U	330 U	330 U	330 U	330 U	330 U
Pyridine	330 U	330 U	330 U	330 U	330 U	330 U
1,2,4-Trichlorobenzene	330 U	330 U	330 U	330 U	330 U	330 U
2,4,5-Trichlorophenol	800 U	800 U	800 U	800 U	800 U	800 U
2,4,6-Trichlorophenol	330 U	330 U	330 U	330 U	330 U	330 U

BH - Borehole

SVOC - Semivolatile Organic Compounds

U - Indicates compound was analyzed for but not detected

# Semivolatile Soil Analytical Results for Site No. 26

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	026-003BH 1.5-2.5 Dup	026-003BH 6.5-7	026-004BH 2-2.5	026-004BH 9.5-10	026-005BH 1.5-2.5	026-005BH 1.5-2.5 Dup
Sample Date:	05/04/95	05/04/95	05/03/95	05/03/95	05/03/95	05/03/95
Lab Sample No.:	9505209-01	9505209-03	9505164-03	9505164-04	9505164-05	9505164-09
SVOCs	Soil	Soil	Soil	Soil	Soil	Soil
Acenaphthene	660 U	330 U	330 U	330 U	330 U	990 U
Acenaphthylene	660 U	330 U	330 U	330 U	330 U	990 U
Aniline	660 U	330 U	330 U	330 U	330 U	990 U
Anthracene	660 U	330 U	330 U	330 U	330 U	990 U
Benzo(a)Anthracene	660 U	330 U	330 U	330 U	330 U	990 U
Benzo(b)Fluoranthene	660 U	330 U	330 U	330 U	330 U	990 U
Benzo(k)Fluoranthene	660 U	330 U	330 U	330 U	330 U	990 U
Benzo(a)Pyrene	660 U	330 U	330 U	330 U	330 U	990 U
Benzoic Acid	3200U	1600 U	1600 U	1600 U	1600 U	4800 U
Benzo(g,h,i)Perylene	660 U	330 U	330 U	330 U	330 U	990 U
Benzyl alcohol	660 U	330 U	330 U	330 U	330 U	990 U
4-Bromophenylphenyl ether	660 U	330 U	330 U	330 U	330 U	990 U
Butylbenzylphthalate	660 U	330 U	330 U	330 U	330 U	990 U
di-n-Butyl phthalate	660 U	330 U	330 U	330 U	330 U	990 U
Carbazole	660 U	330 U	330 U	330 U	330 U	990 U
4-Chloroaniline	660 U	330 U	330 U	330 U	330 U	990 U
bis(2-Chloroethoxy)Methane	660 U	330 U	330 U	330 U	330 U	990 U
bis(2-Chloroethyl)Ether	660 U	330 U	330 U	330 U	330 U	990 U
bis(2-Chloroisopropyl)Ether	660 U	330 U	330 U	330 U	330 U	990 U
4-Chloro-3-Methylphenol	660 U	330 U	330 U	330 U	330 U	990 U
2-Chloronaphthalene	660 U	330 U	330 U	330 U	330 U	990 U
2-Chlorophenol	660 U	330 U	330 U	330 U	330 U	990 U
4-Chlorophenylphenyl ether	660 U	330 U	330 U	330 U	330 U	990 U
Chrysene	660 U	330 U	330 U	330 U	330 U	990 U
Dibenz(a,h)Anthracene	660 U	330 U	330 U	330 U	330 U	990 U
Dibenzofuran	660 U	330 U	330 U	330 U	330 U	990 U
1,2-Dichlorobenzene	660 U	330 U	330 U	330 U	330 U	990 U
1,3-Dichlorobenzene	660 U	330 U	330 U	330 U	330 U	990 U
1,4-Dichlorobenzene	660 U	330 U	330 U	330 U	330 U	990 U
3,3'-Dichlorobenzidine	660 U	330 U	330 U	330 U	330 U	990 U
2,4-Dichlorophenol	660 U	330 U	330 U	330 U	330 U	990 U
Diethylphthalate	660 U	330 U	330 U	330 U	330 U	990 U
2,4-Dimethylphenol	660 U	330 U	330 U	330 U	330 U	990 U
Dimethyl Phthalate	660 U	330 U	330 U	330 U	330 U	990 U

BH - Borehole

SVOC - Semivolatile Organic Compounds

U - Indicates compound was analyzed for but not detected

# Appendix K.8

## Semivolatle Soil Analytical Results for Site No. 26 Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	026-003BH 1.5-2.5 Dup	026-003BH 6.5-7	026-004BH 2-2.5	026-004BH 9.5-10	026-005BH 1.5-2.5	026-005BH 1.5-2.5 Dup
Sample Date:	05/04/95	05/04/95	05/03/95	05/03/95	05/03/95	05/03/95
Lab Sample No.:	9505209-01	9505209-03	9505164-03	9505164-04	9505164-05	9505164-09
SVOCs	Matrix	Soil	Soil	Soil	Soil	Soil
4,6-Dinitro-2-Methylphenol	1600 U	800 U	800 U	800 U	800 U	2400 U
2,4-Dinitrophenol	1600 U	800 U	800 U	800 U	800 U	2400 U
2,4-Dinitrotoluene	660 U	330 U	330 U	330 U	330 U	990 U
2,6-Dinitrotoluene	660 U	330 U	330 U	330 U	330 U	990 U
1,2-Diphenylhydrazine	660 U	330 U	330 U	330 U	330 U	990 U
bis(2-Ethylhexyl)Phthalate	660 U	330 U	330 U	330 U	330 U	990 U
Fluoranthene	660 U	330 U	330 U	330 U	330 U	990 U
Fluorene	660 U	330 U	330 U	330 U	330 U	990 U
Hexachlorobenzene	660 U	330 U	330 U	330 U	330 U	990 U
Hexachlorobutadiene	660 U	330 U	330 U	330 U	330 U	990 U
Hexachloroethane	660 U	330 U	330 U	330 U	330 U	990 U
Hexachlorocyclopentadiene	660 U	330 U	330 U	330 U	330 U	990 U
Indeno(1,2,3-cd)Pyrene	660 U	330 U	330 U	330 U	330 U	990 U
Isophorone	660 U	330 U	330 U	330 U	330 U	990 U
2-Methylnaphthalene	660 U	330 U	330 U	330 U	330 U	990 U
2-Methylphenol	660 U	330 U	330 U	330 U	330 U	990 U
4-Methylphenol	660 U	330 U	330 U	330 U	330 U	990 U
Naphthalene	660 U	330 U	330 U	330 U	330 U	990 U
2-Nitroaniline	1600 U	800 U	800 U	800 U	800 U	2400 U
3-Nitroaniline	1600 U	800 U	800 U	800 U	800 U	2400 U
4-Nitroaniline	1600 U	800 U	800 U	800 U	800 U	2400 U
Nitrobenzene	660 U	330 U	330 U	330 U	330 U	990 U
2-Nitrophenol	660 U	330 U	330 U	330 U	330 U	990 U
4-Nitrophenol	1600 U	800 U	800 U	800 U	800 U	2400 U
N-Nitrosodiphenylamine (1)	660 U	330 U	330 U	330 U	330 U	990 U
N-Nitroso-Di-n-Propylamine	660 U	330 U	330 U	330 U	330 U	990 U
Di-n-Octyl Phthalate	660 U	330 U	330 U	330 U	330 U	990 U
Pentachlorophenol	1600 U	800 U	800 U	800 U	800 U	2400 U
Phenanthrene	660 U	330 U	330 U	330 U	330 U	990 U
Phenol	660 U	330 U	330 U	330 U	330 U	990 U
Pyrene	660 U	330 U	330 U	330 U	330 U	990 U
Pyridine	660 U	330 U	330 U	330 U	330 U	990 U
1,2,4-Trichlorobenzene	660 U	330 U	330 U	330 U	330 U	990 U
2,4,5-Trichlorophenol	1600 U	800 U	800 U	800 U	800 U	2400 U
2,4,6-Trichlorophenol	660 U	330 U	330 U	330 U	330 U	990 U

# Semivolatle Soil Analytical Results for Site No.26

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	026-005BH-9.5-10	026-006BH-2-2.5	026-006BH-11.5-12
Sample Date:	05/03/95	05/03/95	05/03/95
Lab Sample No.:	9505164-06	9505164-08	9505164-07
SVOCs	Matrix	Soil	Soil
Acenaphthene	330 U	660 U	330 U
Acenaphthylene	330 U	660 U	330 U
Aniline	330 U	660 U	330 U
Anthracene	330 U	660 U	330 U
Benzo(a)Anthracene	330 U	660 U	330 U
Benzo(b)Fluoranthene	330 U	660 U	330 U
Benzo(k)Fluoranthene	330 U	660 U	330 U
Benzo(a)Pyrene	330 U	660 U	330 U
Benzoic Acid	1600 U	3200 U	1600 U
Benzo(g,h,i)Perylene	330 U	660 U	330 U
Benzyl alcohol	330 U	660 U	330 U
4-Bromophenylphenyl ether	330 U	660 U	330 U
Butylbenzylphthalate	330 U	660 U	330 U
di-n-Butyl phthalate	330 U	660 U	330 U
Carbazole	330 U	660 U	330 U
4-Chloroaniline	330 U	660 U	330 U
bis(2-Chloroethoxy)Methane	330 U	660 U	330 U
bis(2-Chloroethyl)Ether	330 U	660 U	330 U
bis(2-Chloroisopropyl)Ether	330 U	660 U	330 U
4-Chloro-3-Methylphenol	330 U	660 U	330 U
2-Chloronaphthalene	330 U	660 U	330 U
2-Chlorophenol	330 U	660 U	330 U
4-Chlorophenylphenyl ether	330 U	660 U	330 U
Chrysene	330 U	660 U	330 U
Dibenz(a,h)Anthracene	330 U	660 U	330 U
Dibenzofuran	330 U	660 U	330 U
1,2-Dichlorobenzene	330 U	660 U	330 U
1,3-Dichlorobenzene	330 U	660 U	330 U
1,4-Dichlorobenzene	330 U	660 U	330 U
3,3'-Dichlorobenzidine	330 U	660 U	330 U
2,4-Dichlorophenol	330 U	660 U	330 U
Diethylphthalate	330 U	660 U	330 U
2,4-Dimethylphenol	330 U	660 U	330 U
Dimethyl Phthalate	330 U	660 U	330 U

BH - Borehole  
SVOC - Semivolatle Organic Compounds

U - Indicates compound was analyzed for but not detected



**Appendix K.8**  
**Semivolatile Soil Analytical Results for Site No.26**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
(Results in micrograms per kilogram unless otherwise noted)

Location No.:	026-005BH 9.5-10	026-006BH 2-2.5	026-006BH 11.5-12
Sample Date:	05/03/95	05/03/95	05/03/95
Lab Sample No.:	9505164-06	9505164-08	9505164-07
SVOCs	Matrix	Soil	Soil
4,6-Dinitro-2-Methylphenol		800 U	800 U
2,4-Dinitrophenol		800 U	800 U
2,4-Dinitrotoluene		330 U	330 U
2,6-Dinitrotoluene		330 U	330 U
1,2-Diphenylhydrazine		330 U	330 U
bis(2-Ethylhexyl)Phthalate		330 U	330 U
Fluoranthene		330 U	330 U
Fluorene		330 U	330 U
Hexachlorobenzene		330 U	330 U
Hexachlorobutadiene		330 U	330 U
Hexachloroethane		330 U	330 U
Hexachlorocyclopentadiene		330 U	330 U
Indeno(1,2,3-cd)Pyrene		330 U	330 U
Isophorone		330 U	330 U
2-Methylnaphthalene		330 U	330 U
2-Methylphenol		330 U	330 U
4-Methylphenol		330 U	330 U
Naphthalene		330 U	330 U
2-Nitroaniline		800 U	800 U
3-Nitroaniline		800 U	800 U
4-Nitroaniline		800 U	800 U
Nitrobenzene		330 U	330 U
2-Nitrophenol		330 U	330 U
4-Nitrophenol		800 U	800 U
N-Nitrosodiphenylamine (1)		330 U	330 U
N-Nitroso-Di-n-Propylamine		330 U	330 U
Di-n-Octyl Phthalate		330 U	330 U
Pentachlorophenol		800 U	800 U
Phenanthrene		330 U	330 U
Phenol		330 U	330 U
Pyrene		330 U	330 U
Pyridine		330 U	330 U
1,2,4-Trichlorobenzene		330 U	330 U
2,4,5-Trichlorophenol		800 U	800 U
2,4,6-Trichlorophenol		330 U	330 U

**Appendix K.9**  
**Metals Soil Analytical Results for Site No. 26**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in milligrams per kilogram unless otherwise noted)

<b>Location No.:</b>	026-001BH 2-2.5	026-001BH 9.5-10	026-002BH 2-2.5	026-002BH 6.5-7
<b>Sample Date:</b>	05/03/95	05/03/95	05/04/95	05/04/95
<b>Lab Sample No.:</b>	9505164-01	9505164-02	9505209-04	9505209-05
<b>Metals</b>	<b>Matrix</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
Cadmium, Total	8 U	8 U	8 U	8 U
Chromium, Total	13	10	3.1	3.8
Lead, Total	2.8	2.4	3.2	1.5

<b>Location No.:</b>	026-003BH 1.5-2.5	026-003BH 1.5-2.5 Dup	026-003BH 6.5-7	026-004BH 2-2.5	026-004BH 9.5-10
<b>Sample Date:</b>	05/04/95	05/04/95	05/04/95	05/03/95	05/03/95
<b>Lab Sample No.:</b>	9505209-02	9505209-01	9505209-03	9505164-03	9505164-04
<b>Metals</b>	<b>Matrix</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
Cadmium, Total	8 U	8 U	8 U	8 U	8 U
Chromium, Total	18	6	3.2	9	7
Lead, Total	5.9	3.2	4.6	5.3	2.5

<b>Location No.:</b>	026-005BH 1.5-2.5	026-005BH 1.5-2.5 Dup	026-005BH 9.5-10	026-006BH 2-2.5	026-006BH 11.5-12
<b>Sample Date:</b>	05/03/95	05/03/95	05/03/95	05/03/95	05/03/95
<b>Lab Sample No.:</b>	9505164-05	9505164-09	9505164-06	9505164-08	9505164-07
<b>Metals</b>	<b>Matrix</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>	<b>Soil</b>
Cadmium, Total	8 U	8 U	8 U	8 U	8 U
Chromium, Total	7	8	3	5	4
Lead, Total	4.6	4.2	2.4	2.4	2.6

**Appendix K.10**  
**Volatile Groundwater Analytical Results For Site No. 26**  
**Duluth Air National Guard Base, Duluth, Minnesota**

(Results in micrograms per liter unless otherwise noted)

Location No.:	026-001MW-GW1	026-002MW-GW1	026-003MW-GW1	026-003MW-GW1 Dup
Sample Date:	05/18/95	05/18/95	05/18/95	05/18/95
Lab Sample No.:	9505714-03	9505714-01	9505714-04	9505714-02
VOCs (8260)	Matrix	Water	Water	Water
Benzene	1U	1U	1U	1U
Bromobenzene	1U	1U	1U	1U
Bromochloromethane	1U	1U	1U	1U
Bromodichloromethane	1U	1U	1U	1U
Bromoform	1U	1U	1U	1U
Bromomethane	2U	2U	2U	2U
n-Butylbenzene	1U	1U	1U	1U
sec-Butylbenzene	1U	1U	1U	1U
tert-Butylbenzene	1U	1U	1U	1U
Carbon tetrachloride	1U	1U	1U	1U
Chlorobenzene	1U	1U	1U	1U
Chlorodibromomethane	1U	1U	1U	1U
Chloroethane	4U	4U	4U	4U
Chloroform	1U	1U	1U	1U
Chloromethane	1U	1U	1U	1U
2-Chlorotoluene	1U	1U	1U	1U
4-Chlorotoluene	1U	1U	1U	1U
1,2-Dibromo-3-chloropropane	1U	1U	1U	1U
1,2-Dibromoethane	1U	1U	1U	1U
Dibromomethane	1U	1U	1U	1U
1,2-Dichlorobenzene	1U	1U	1U	1U
1,3-Dichlorobenzene	1U	1U	1U	1U
1,4-Dichlorobenzene	1U	1U	1U	1U
Dichlorodifluoromethane	1U	1U	1U	1U
1,1-Dichloroethane	1U	1U	1U	1U
1,2-Dichloroethane	1U	1U	1U	1U
1,1-Dichloroethene	1U	1U	1U	1U
1,2-Dichloropropane	1U	1U	1U	1U
1,3-Dichloropropane	1U	1U	1U	1U
2,2-Dichloropropane	1U	1U	1U	1U
1,1-Dichloropropene	1U	1U	1U	1U
Ethylbenzene	1U	1U	1U	1U
Hexachlorobutadiene	1U	1U	1U	1U
Isopropylbenzene	1U	1U	1U	1U
p-Isopropyltoluene	1U	1U	1U	1U

MW - Monitoring Well  
 GW - Groundwater

U - Indicates compound was analyzed for but not detected  
 026-003MW-GW1  
 026-003MW-GW1 Dup

# Volatile Groundwater Analytical Results For Site No. 26

Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per liter unless otherwise noted)

Location No.:	026-001MW-GW1	026-002MW-GW1	026-003MW-GW1	026-003MW-GW1 Dup
Sample Date:	05/18/95	05/18/95	05/18/95	05/18/95
Lab Sample No.:	9505714-03	9505714-01	9505714-04	9505714-02
VOCs (8260)	Matrix	Water	Water	Water
Methylene chloride	1U	1U	1U	1U
Naphthalene	1U	1U	1U	1U
n-Propylbenzene	1U	1U	1U	1U
Styrene	1U	1U	1U	1U
1,1,1,2-Tetrachloroethane	1U	1U	1U	1U
1,1,2,2-Tetrachloroethane	1U	1U	1U	1U
Tetrachloroethene	1U	1U	1U	1U
Toluene	1U	1U	1U	1U
1,2,3-Trichlorobenzene	1U	1U	1U	1U
1,2,4-Trichlorobenzene	1U	1U	1U	1U
1,1,1-Trichloroethane	1U	1U	1U	1U
1,1,2-Trichloroethane	1U	1U	1U	1U
Trichloroethene	1U	1U	1U	1U
Trichlorofluoromethane	1U	1U	1U	1U
1,2,3-Trichloropropane	1U	1U	1U	1U
1,2,4-Trimethylbenzene	1U	1U	1U	1U
1,3,5-Trimethylbenzene	1U	1U	1U	1U
Vinyl chloride	1U	1U	1U	1U
Xylenes (total)	1U	1U	1U	1U
1,2-Dichloroethene (total)	1U	1U	1U	1U

MW - Monitoring Well  
GW - Groundwater

U - Indicates compound was analyzed for but not detected  
VOC-8260 - Volatile Organic Compounds-USEPA SW-846/8260

**Appendix K.11**  
**Semivolatile Groundwater Analytical Results for Site No. 26**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in micrograms per liter unless otherwise noted)

Location No.:	026-001MW-GW1	026-002MW-GW1	026-003MW-GW1	026-003MW-GW1 Dup
Sample Date:	05/18/95	05/18/95	05/18/95	05/18/95
Lab Sample No.:	9505714-03	9505714-01	9505714-04	9505714-02
SVOCs	Matrix	Water	Water	Water
Acenaphthene	5 U	5 U	5 U	5 U
Acenaphthylene	5 U	5 U	5 U	5 U
Aniline	5 U	5 U	5 U	5 U
Anthracene	5 U	5 U	5 U	5 U
Benzo(a)Anthracene	5 U	5 U	5 U	5 U
Benzo(b)Fluoranthene	5 U	5 U	5 U	5 U
Benzo(k)Fluoranthene	5 U	5 U	5 U	5 U
Benzo(a)Pyrene	5 U	5 U	5 U	5 U
Benzoic Acid	25 U	25 U	25 U	25 U
Benzo(g,h,i)Perylene	5 U	5 U	5 U	5 U
Benzyl alcohol	5 U	5 U	5 U	5 U
4-Bromophenylphenyl ether	5 U	5 U	5 U	5 U
Butylbenzylphthalate	5 U	5 U	5 U	5 U
di-n-Butyl phthalate	5 U	5 U	5 U	5 U
Carbazole	5 U	5 U	5 U	5 U
4-Chloroaniline	5 U	5 U	5 U	5 U
bis(2-Chloroethoxy)Methane	5 U	5 U	5 U	5 U
bis(2-Chloroethyl)Ether	5 U	5 U	5 U	5 U
bis(2-Chloroisopropyl)Ether	5 U	5 U	5 U	5 U
4-Chloro-3-Methylphenol	5 U	5 U	5 U	5 U
2-Chloronaphthalene	5 U	5 U	5 U	5 U
2-Chlorophenol	5 U	5 U	5 U	5 U
4-Chlorophenylphenyl ether	5 U	5 U	5 U	5 U
Chrysene	5 U	5 U	5 U	5 U
Dibenz(a,h)Anthracene	5 U	5 U	5 U	5 U
Dibenzofuran	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	5 U	5 U	5 U	5 U
3,3'-Dichlorobenzidine	5 U	5 U	5 U	5 U
2,4-Dichlorophenol	5 U	5 U	5 U	5 U
Diethylphthalate	5 U	5 U	5 U	5 U
2,4-Dimethylphenol	5 U	5 U	5 U	5 U
Dimethyl Phthalate	5 U	5 U	5 U	5 U

MW - Monitoring Well  
 GW - Groundwater

U - Indicates compound was analyzed for but not detected

# Semivolatile Groundwater Analytical Results for Site No. 26

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per liter unless otherwise noted)

Location No.:	026-001MW-GW1	026-002MW-GW1	026-003MW-GW1	026-003MW-GW1 Dup
Sample Date:	05/18/95	05/18/95	05/18/95	05/18/95
Lab Sample No.:	9505714-03	9505714-01	9505714-04	9505714-02
SVOCs	Matrix	Water	Water	Water
4,6-Dinitro-2-Methylphenol		25 U	25 U	25 U
2,4-Dinitrophenol		25 U	25 U	25 U
2,4-Dinitrotoluene		5 U	5 U	5 U
2,6-Dinitrotoluene		5 U	5 U	5 U
1,2-Diphenylhydrazine		5 U	5 U	5 U
bis(2-Ethylhexyl)Phthalate		5 U	5 U	5 U
Fluoranthene		5 U	5 U	5 U
Fluorene		5 U	5 U	5 U
Hexachlorobenzene		5 U	5 U	5 U
Hexachlorobutadiene		5 U	5 U	5 U
Hexachloroethane		5 U	5 U	5 U
Hexachlorocyclopentadiene		5 U	5 U	5 U
Indeno(1,2,3-cd)Pyrene		5 U	5 U	5 U
Isophorone		5 U	5 U	5 U
2-Methylnaphthalene		5 U	5 U	5 U
2-Methylphenol		5 U	5 U	5 U
4-Methylphenol		5 U	5 U	5 U
Naphthalene		5 U	5 U	5 U
2-Nitroaniline		25 U	25 U	25 U
3-Nitroaniline		25 U	25 U	25 U
4-Nitroaniline		25 U	25 U	25 U
Nitrobenzene		5 U	5 U	5 U
2-Nitrophenol		25 U	25 U	25 U
4-Nitrophenol		25 U	25 U	25 U
N-Nitrosodiphenylamine (1)		5 U	5 U	5 U
N-Nitroso-Di-n-Propylamine		5 U	5 U	5 U
Di-n-Octyl Phthalate		5 U	5 U	5 U
Pentachlorophenol		25 U	25 U	25 U
Phenanthrene		5 U	5 U	5 U
Phenol		51	51	51
Pyrene		5 U	5 U	5 U
Pyridine		5 U	5 U	5 U
1,2,4-Trichlorobenzene		5 U	5 U	5 U
2,4,5-Trichlorophenol		10 U	10 U	10 U
2,4,6-Trichlorophenol		5 U	5 U	5 U

MW - Monitoring Well  
GW - Groundwater

U - Indicates compound was analyzed for but not detected  
SVOC - Semivolatile Organic Compounds

## **APPENDIX L**

### **SUMMARY OF THE QA/QC ANALYTICAL RESULTS**

## **INTRODUCTION**

The following is a list of analytical results for QA/QC samples collected at IRP Sites No. 25 and No. 26.

### **IRP SITES NO. 25 AND NO. 26**

#### **SOIL SAMPLES**

- L.1 – Volatile QA/QC Summary Results for IRP Sites No. 25 and No. 26
- L.2 – Semivolatile QA/QC Summary Results for IRP Sites No. 25 and No. 26
- L.3 – Metals QA/QC Summary Results for IRP Sites No. 25 and No. 26

#### **GROUNDWATER SAMPLES**

- L.4 – Volatile QA/QC Summary Results for IRP Sites No. 25 and No. 26
- L.5 – Semivolatile QA/QC Summary Results for IRP Sites No. 25 and No. 26
- L.6 – Metals QA/QC Summary Results for IRP Sites No. 25 and No. 26



**THIS PAGE INTENTIONALLY LEFT BLANK**

# Volatile QA/QC Summary Results for Sites No.25 and No.26

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-009BH 14-14.5 MS	025-009BH 14-14.5MSD	026-001BH 9-9.5 MS	026-001BH 9-9.5 MSD
Sample Date:	05/12/95	05/12/95	05/03/95	05/03/95
Lab Sample No.:	9505512-12	9505512-13	9505164-12	9505164-13
VOCs	Matrix	Soil	Soil	Soil
Acetone	100 U	100 U	100 U	100 U
Benzene	46	46	47	49
Bromodichloromethane	42	43	5 U	5 U
Bromoform	37	39	5 U	5 U
Bromomethane	31	31	10 U	10 U
2-Butanone	20 U	20 U	20 U	20 U
Carbon Disulfide	5 U	5 U	5 U	5 U
Carbon Tetrachloride	38	39	5 U	5 U
Chlorobenzene	43	42	41	43
Chloroethane	35	35	10 U	10 U
2-Chloroethylvinylether	47	48	10 U	10 U
Chloroform	48	48	5 U	5 U
Chloromethane	34	34	10 U	10 U
Dibromochloromethane	41	42	5 U	5 U
1,1-Dichloroethane	49	48	5 U	5 U
1,1-Dichloroethene	36	35	44	46
1,2-Dichloroethane	46	47	5 U	5 U
total-1,2-Dichloroethene	84	83	5 U	5 U
1,2-Dichloropropane	48	48	5 U	5 U
cis-1,3-Dichloropropene	38	40	5 U	5 U
trans-1,3-Dichloropropene	42	43	5 U	5 U
Ethylbenzene	44	42	5 U	5 U
2-Hexanone	10 U	10 U	10 U	10 U
Methylene Chloride	40	42	5 U	5 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U
Styrene	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	44	46	5 U	5 U
Tetrachloroethene	40	38	5 U	5 U
Toluene	47	46	43	45
1,1,1-Trichloroethane	46	46	5 U	5 U
1,1,2-Trichloroethane	43	46	5 U	5 U
Trichloroethene	38	43	44	46
Trichlorofluoromethane	5 U	37	5 U	5 U
Vinyl Acetate	10 U	10 U	10 U	10 U
Vinyl Chloride	33	33	10 U	10 U
Xylenes (total)	35	34	5 U	5 U

MS - Matrix Spike

MSD - Matrix Spike Duplicate

VOC - Volatile Organic Compounds

BH - Borehole

U - Indicates compound was analyzed for but not detected

QA/QC - Quality Assurance/Quality Control

# Appendix L.2

## Semivolatile QA/QC Summary Results for Sites No. 25 and No. 26 Duluth Air National Guard Base, Duluth, Minnesota (Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-008BH 10.5-11MS	025-008BH 10.5-11 MSD	026-001BH 9.9-5 MS	026-001BH 9.9-5 MSD
Sample Date:	05/12/95	05/12/95	05/03/95	05/03/95
Lab Sample No.:	9505512-14	9505512-15	9505164-12	9505164-13
SVOCs	Matrix	Soil	Soil	Soil
Acenaphthene	1300	330 U	1200	1200
Acenaphthylene	330 U	330 U	330 U	330 U
Aniline	330 U	330 U	330 U	330 U
Anthracene	330 U	330 U	330 U	330 U
Benzo(a)Anthracene	330 U	330 U	330 U	330 U
Benzo(b)Fluoranthene	330 U	330 U	330 U	330 U
Benzo(k)Fluoranthene	330 U	330 U	330 U	330 U
Benzo(a)Pyrene	330 U	330 U	330 U	330 U
Benzoic Acid	1600 U	1600 U	1600 U	1600 U
Benzo(g,h,i)Perylene	330 U	330 U	330 U	330 U
Benzyl alcohol	330 U	330 U	330 U	330 U
4-Bromophenylphenyl ether	330 U	330 U	330 U	330 U
Butylbenzylphthalate	330 U	330 U	330 U	330 U
di-n-Butyl phthalate	330 U	330 U	330 U	330 U
Carbazole	330 U	330 U	330 U	330 U
4-Chloroaniline	330 U	330 U	330 U	330 U
bis(2-Chloroethoxy)Methane	330 U	330 U	330 U	330 U
bis(2-Chloroethyl)Ether	330 U	330 U	330 U	330 U
bis(2-Chloroisopropyl)Ether	330 U	330 U	330 U	330 U
4-Chloro-3-Methylphenol	2000	2000	2100	2200
2-Chloronaphthalene	330 U	330 U	330 U	330 U
2-Chlorophenol	2200	2100	1500	1600
4-Chlorophenylphenyl ether	330 U	330 U	330 U	330 U
Chrysene	330 U	330 U	330 U	330 U
Dibenz(a,h)Anthracene	330 U	330 U	330 U	330 U
Dibenzofuran	330 U	330 U	330 U	330 U
1,2-Dichlorobenzene	330 U	330 U	330 U	330 U
1,3-Dichlorobenzene	330 U	330 U	330 U	330 U
1,4-Dichlorobenzene	1100	1100	1100	1200
3,3'-Dichlorobenzidine	330 U	330 U	330 U	330 U
2,4-Dichlorophenol	330 U	330 U	330 U	330 U
Diethylphthalate	330 U	330 U	330 U	330 U
2,4-Dimethylphenol	330 U	330 U	330 U	330 U
Dimethyl Phthalate	330 U	330 U	330 U	330 U

MS - Matrix Spike

MSD - Matrix Spike Duplicate

BH - Borehole  
U - Indicates compound was analyzed for but not detected  
QA/QC - Quality Assurance/Quality Control

## Semivolatile QA/QC Summary Results for Sites No. 25 and No. 26

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per kilogram unless otherwise noted)

Location No.:	025-008BH 10.5-11MS	025-008BH 10.5-11 MSD	026-001BH 9-9.5 MS	026-001BH 9-9.5 MSD
Sample Date:	05/12/95	05/12/95	05/03/95	05/03/95
Lab Sample No.:	9505512-14	9505512-15	9505164-12	9505164-13
SVOCs	Matrix	Soil	Soil	Soil
4,6-Dinitro-2-Methylphenol		800 U	800 U	800 U
2,4-Dinitrophenol		800 U	800 U	800 U
2,4-Dinitrotoluene		1300	1600	1600
2,6-Dinitrotoluene		330 U	330 U	330 U
1,2-Diphenylhydrazine		330 U	330 U	330 U
bis(2-Ethylhexyl)Phthalate		330 U	330 U	330 U
Fluoranthene		330 U	330 U	330 U
Fluorene		330 U	330 U	330 U
Hexachlorobenzene		330 U	330 U	330 U
Hexachlorobutadiene		330 U	330 U	330 U
Hexachloroethane		330 U	330 U	330 U
Hexachlorocyclopentadiene		330 U	330 U	330 U
Indeno(1,2,3-cd)Pyrene		330 U	330 U	330 U
Isophorone		330 U	330 U	330 U
2-Methylnaphthalene		330 U	330 U	330 U
2-Methylphenol		330 U	330 U	330 U
4-Methylphenol		330 U	330 U	330 U
Naphthalene		330 U	330 U	330 U
2-Nitroaniline		800 U	800 U	800 U
3-Nitroaniline		800 U	800 U	800 U
4-Nitroaniline		800 U	800 U	800 U
Nitrobenzene		330 U	330 U	330 U
2-Nitrophenol		330 U	330 U	330 U
4-Nitrophenol		1600	3300	3700
N-Nitrosodiphenylamine (1)		330 U	330 U	330 U
N-Nitroso-Di-n-Propylamine		1300	1500	1700
Di-n-Octyl Phthalate		330 U	330 U	330 U
Pentachlorophenol		1800	2400	2400
Phenanthrene		330 U	330 U	330 U
Phenol		2000	1200	1200
Pyrene		1300	1100	1000
Pyridine		330 U	330 U	330 U
1,2,4-Trichlorobenzene		1300	1200	1400
2,4,5-Trichlorophenol		800 U	800 U	800 U
2,4,6-Trichlorophenol		330 U	330 U	330 U

MS - Matrix Spike

MSD - Matrix Spike Duplicate

SVOC - Semivolatile Organic Compounds

BH - Borehole

U - Indicates compound was analyzed for but not detected

QA/QC - Quality Assurance/ Quality Control

**Appendix L.3**  
**Metals QA/QC Summary Results for Sites No. 25 and No. 26**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in milligrams per kilogram unless otherwise noted)

Location No.:		025-009BH 14-14.5 MS	025-009BH 14-14.5 MSD	026-001BH 9-9.5 MS	026-001BH 9-9.5 MSD
Sample Date:		05/12/95	05/12/95	05/03/95	05/03/95
Lab Sample No.:		9505512-12	9505512-13	9505164-12	9505164-13
Metals	Matrix	Soil	Soil	Soil	Soil
Mercury, Total		1.1	1.0	N/A	N/A
Cadmium, Total		89.5	88.7	102	101
Chromium, Total		118	114	11	12
Nickel, Total		114	112	N/A	N/A
Lead, Total		7.8	7.8	6.5	6.5

MS - Matrix Spike  
 MSD - Matrix Spike Duplicate  
 BH - Borehole

U - Indicates compound was analyzed for but not detected  
 QA/QC - Quality Assurance/Quality Control  
 N/A - Not Analyzed

# Volatile QA/QC Summary Results for Sites No.25 and No.26

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per liter unless otherwise noted)

Location No.:	SI-001-FB	SI-002-FB	SI-001-TB	026-003-RB
Sample Date:	05/18/95	05/19/95	05/08/95	05/18/95
Lab Sample No.:	9505714-05	9505767-02	9505714-06	9505714-07
VOCs (8260)	Matrix	Water	Water	Water
Benzene	1U	5U	1U	1U
Bromobenzene	1U	5U	1U	1U
Bromochloromethane	1U	5U	1U	1U
Bromodichloromethane	1U	5U	1U	1U
Bromoform	1U	5U	1U	1U
Bromomethane	2U	10U	2U	2U
n-Butylbenzene	1U	5U	1U	1U
sec-Butylbenzene	1U	5U	1U	1U
tert-Butylbenzene	1U	5U	1U	1U
Carbon tetrachloride	1U	5U	1U	1U
Chlorobenzene	1U	5U	1U	1U
Chlorodibromomethane	1U	5U	1U	1U
Chloroethane	4U	10U	4U	4U
Chloroform	5	6	1U	4
Chloromethane	1U	10U	1U	1U
2-Chlorotoluene	1U	5U	1U	1U
4-Chlorotoluene	1U	5U	1U	1U
1,2-Dibromo-3-chloropropane	1U	5U	1U	1U
1,2-Dibromoethane	1U	5U	1U	1U
Dibromomethane	1U	5U	1U	1U
1,2-Dichlorobenzene	1U	5U	1U	1U
1,3-Dichlorobenzene	1U	5U	1U	1U
1,4-Dichlorobenzene	1U	5U	1U	1U
Dichlorodifluoromethane	1U	10U	1U	1U
1,1-Dichloroethane	1U	5U	1U	1U
1,2-Dichloroethane	1U	5U	1U	1U
1,1-Dichloroethene	1U	5U	1U	1U
1,2-Dichloropropane	1U	5U	1U	1U
1,3-Dichloropropane	1U	5U	1U	1U
2,2-Dichloropropane	1U	5U	1U	1U
1,1-Dichloropropene	1U	5U	1U	1U
Ethylbenzene	1U	5U	1U	1U
Hexachlorobutadiene	1U	5U	1U	1U
Isopropylbenzene	1U	5U	1U	1U
p-Isopropyltoluene	1U	5U	1U	1U

U - Indicates compound was analyzed for but not detected  
VOC 8260 - Volatile Organic Compounds-Meth. 8260  
QA/QC - Quality Assurance/Quality Control

FB - Field Blank  
SI - Site Investigation  
TB - Trip Blank

# Appendix L.4

## Volatiles QA/QC Summary Results for Sites No.25 and No.26 Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per liter unless otherwise noted)

Location No.:	SI-001-FB	SI-002FB	SI-001-TB	026-003-RB
Sample Date:	05/18/95	05/19/95	05/08/95	05/18/95
Lab Sample No.:	9505714-05	9505767-02	9505714-06	9505714-07
VOCs (8260)	Matrix	Water	Water	Water
Methylene chloride	4	5 U	1 U	3
Naphthalene	1 U	5 U	1 U	1 U
n-Propylbenzene	1 U	5 U	1 U	1 U
Styrene	1 U	5 U	1 U	1 U
1,1,1,2-Tetrachloroethane	1 U	5 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	5 U	1 U	1 U
Tetrachloroethene	1 U	5 U	1 U	1 U
Toluene	1 U	5 U	1 U	1 U
1,2,3-Trichlorobenzene	1 U	5 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	5 U	1 U	1 U
1,1,1-Trichloroethane	1 U	5 U	1 U	1 U
1,1,2-Trichloroethane	1 U	5 U	1 U	1 U
Trichloroethene	1 U	5 U	1 U	1 U
Trichlorofluoromethane	1 U	5 U	1 U	1 U
1,2,3-Trichloropropane	1 U	5 U	1 U	1 U
1,2,4-Trimethylbenzene	1 U	5 U	1 U	1 U
1,3,5-Trimethylbenzene	1 U	5 U	1 U	1 U
Vinyl chloride	1 U	10 U	1 U	1 U
Xylenes (total)	1 U	5 U	1 U	1 U
1,2-Dichloroethene (total)	1 U	5 U	1 U	1 U

U - Indicates compound was analyzed for but not detected  
VOC 8260 - Volatile Organic Compounds-Meth. 8260  
QA/QC - Quality Assurance/Quality Control

# Volatile QA/QC Summary Results for Sites No.25 and No.26

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per liter unless otherwise noted)

Location No.:	025-001-RB	025-002-RB	026-002-RB	025-001-TB	025-003-TB	Trip Blank	Equipment Blank
Sample Date:	05/11/95	05/16/95	05/04/95	05/15/95	05/16/95	04/26/95	05/03/95
Lab Sample No.:	9505512-01	9505612-02	9505209-06	9505556-01	9505612-01	9505209-07	9505164-11
VOCs	Matrix	Water	Water	Water	Water	Water	Water
Acetone	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Benzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Carbon Disulfide	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chloroethylvinylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	5 U	5	5	5 U	5 U	5 U	5
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
total-1,2-Dichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichlorofluoromethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Xylenes (total)	5 U	5 U	5 U	5 U	5 U	5 U	5 U

RB - Rinsate Blank  
FB - Field Blank  
TB - Trip Blank

QA/QC - Quality Assurance/Quality Control  
U - Indicates compound was analyzed for but not detected  
VOC - Volatile Organic Compounds



**Appendix L.4**  
**Aromatic Volatile QA\QC Summary Results for Site No. 25**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in micrograms per liter unless otherwise noted)

<b>Location No.:</b>	<b>025-003-RB</b>	<b>025-TB</b>
<b>Sample Date:</b>	<b>05/19/95</b>	<b>05/19/95</b>
<b>Lab Sample No.:</b>	<b>9505767-01</b>	<b>9505767-04</b>
<b>BTEX(8020)</b>	<b>Matrix</b>	<b>Water</b>
Benzene	1 U	1 U
Toluene	1 U	1 U
Ethylbenzene	1 U	1 U
Xylenes (total)	1 U	1 U

RB - Rinsate Blank  
 TB - Trip Blank

QA\QC - Quality Assurance\Quality Control

U - Indicates compound was analyzed for but not detected  
 BTEX 8020 - Volatile Organic Compounds Method 8020

# Appendix L.4

## Halogenated Volatile QA\QC Summary Results for Site No.25 Duluth Air National Guard Base, Duluth, Minnesota (Results in micrograms per liter unless otherwise noted)

Location No.:	025-003-RB	025-TB
Sample Date:	05/19/95	05/19/95
Lab Sample No.:	9505767-01	9505767-04
VOC's (8010)	Matrix	Water
Dichlorodifluoromethane	1U	1U
Chloromethane	1U	1U
Vinyl chloride	1U	1U
Bromomethane	1U	1U
Chloroethane	1U	1U
Trichlorofluoromethane	1U	1U
1,1-Dichloroethene	1U	1U
Methylene chloride	4	B 3
Trans-1,2-Dichloroethene	1U	1U
1,1-Dichloroethane	1U	1U
chloroform	5	1U
1,1,1-Trichloroethane	1U	1U
carbon tetrachloride	1U	1U
1,2-Dichloroethane	1U	1U
2-Chloroethylvinyl ether	1U	1U
Trichloroethene	1U	1U
1,2-Dichloropropane	1U	1U
Bromodichloromethane	1U	1U
cis-1,3-Dichloropropene	1U	1U
trans-1,3-Dichloropropene	1U	1U
1,1,2-Trichloroethane	1U	1U
Tetrachloroethene	1U	1U
Dibromochloromethane	1U	1U
Chlorobenzene	1U	1U
Bromoform	1U	1U
1,1,2,2-Tetrachloroethane	1U	1U
1,3-Dichlorobenzene	1U	1U
1,4-Dichlorobenzene	1U	1U
1,2-Dichlorobenzene	1U	1U

B - Indicates compound was detected in the Method Blank  
RB - Rinsate Blank  
TB - Trip Blank

U - Indicates compound was analyzed for but not detected  
PAH 8010-Polynuclear Aromatic Hydrocarbon Compounds

**Appendix L.5**  
**Semivolatile QA/QC Summary Results for Sites No. 25 and No. 26**  
**Duluth Air National Guard Base, Duluth, Minnesota**  
 (Results in micrograms per liter unless otherwise noted)

Location No.:	025-001-RB	025-002-RB	025-003-RB	026-002-RB	026-003-RB	Equipment Blank	SI-001-FB
Sample Date:	05/11/95	05/16/95	05/19/95	05/04/95	05/18/95	05/03/95	05/18/95
Lab Sample No.:	9505512-01	9505612-02	9505767-01	9505209-06	9505714-07	9505164-11	9505714-05
SVOCs	Matrix	Water	Water	Water	Water	Water	Water
Acenaphthene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acenaphthylene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Aniline	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Anthracene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(a)Anthracene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(b)Fluoranthene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(k)Fluoranthene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzo(a)Pyrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzoic Acid	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Benzo(g,h,i)Perylene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzyl alcohol	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Bromophenylphenyl ether	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Butylbenzylphthalate	5 U	5 U	5 U	5 U	5 U	5 U	5 U
di-n-Butyl phthalate	5 U	5	5 U	5 U	5 U	5 U	5
Carbazole	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chloroaniline	5 U	5 U	5 U	5 U	5 U	5 U	5 U
bis(2-Chloroethoxy)Methane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
bis(2-Chloroethyl)Ether	5 U	5 U	5 U	5 U	5 U	5 U	5 U
bis(2-Chloroisopropyl)Ether	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chloro-3-Methylphenol	5 U	5 U	5 U	8	5 U	5 U	5 U
2-Chloronaphthalene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Chlorophenol	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Chlorophenylphenyl ether	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chrysene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibenz(a,h)Anthracene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibenzofuran	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,3-Dichlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,4-Dichlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
3,3'-Dichlorobenzidine	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-Dichlorophenol	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diethylphthalate	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4,6-Dinitro-2-Methylphenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2,4-Dinitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U

RB - Rinsate Blank  
 FB - Field Blank  
 QA/QC - Quality Assurance/ Quality Control

U - Indicates compound was analyzed for but not detected  
 SVOC - Semivolatile Organic Compounds  
 SI - Site Investigation

# Semivolatile QA/QC Summary Results for Sites No. 25 and No. 26

## Duluth Air National Guard Base, Duluth, Minnesota

(Results in micrograms per liter unless otherwise noted)

Location No.:	025-001-RB	025-002-RB	025-003-RB	026-002-RB	026-003-RB	Equipment Blank	SI-001-FB
Sample Date:	05/11/95	05/16/95	05/19/95	05/04/95	05/18/95	05/03/95	05/18/95
Lab Sample No.:	9505512-01	9505612-02	9505767-01	9505209-06	9505714-07	9505164-11	9505714-05
SVOCs	Matrix	Water	Water	Water	Water	Water	Water
2,4-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,6-Dinitrotoluene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Diphenylhydrazine	5 U	5 U	5 U	5 U	5 U	5 U	5 U
bis(2-Ethylhexyl)Phthalate	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Fluoranthene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Fluorene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorobutadiene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachloroethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Hexachlorocyclopentadiene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Indeno(1,2,3-cd)Pyrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Isophorone	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Methylnaphthalene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Methylphenol	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methylphenol	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U
3-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Nitrobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Nitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U
N-Nitrosodiphenylamine (1)	5 U	5 U	5 U	5 U	5 U	5 U	5 U
N-Nitroso-Di-n-Propylamine	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Di-n-Octyl Phthalate	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pentachlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Phenanthrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Phenol	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pyrene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Pyridine	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2,4,5-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	5 U	5 U	5 U	5 U	5 U	5 U	5 U

RB - Rinsate Blank

FB - Field Blank

QA/QC - Quality Assurance/ Quality Control

U - Indicates compound was analyzed for but not detected

SVOC - Semivolatile Organic Compounds

SI - Site Investigation

# Appendix L.6

## Metals QA/QC Summary Results for Sites No.25 and No.26

### Duluth Air National Guard Base, Duluth, Minnesota

(Results in milligrams per liter unless otherwise noted)

Location No.:	025-001-RB	025-002-RB	025-003-RB	026-002-RB
Sample Date:	05/11/95	05/16/95	05/19/95	05/04/95
Lab Sample No.:	9505512-01	9505612-02	9505767-01	9505209-06
Metals	Matrix	Water	Water	Water
Mercury, Total	0.004 U	0.004 U	0.004 U	N/A
Cadmium, Total	0.004 U	0.004 U	0.005 U	0.004 U
Chromium, Total	0.01 U	0.002 U	0.002 U	0.01 U
Nickel, Total	0.02 U	0.02 U	0.02 U	N/A
Lead, Total	0.006	0.006	0.004 U	0.004 U

Location No.:	Equipment Blank	SI-001-FB	SI-002-FB
Sample Date:	05/03/95	05/18/95	05/19/95
Lab Sample No.:	9505164-11	9505174-05	9505767-02
Metals	Matrix	Water	Water
Mercury, Total	N/A	N/A	0.004 U
Cadmium, Total	0.004 U	0.005 U	0.005 U
Chromium, Total	0.01 U	0.002 U	0.002 U
Nickel, Total	N/A	0.02 U	0.02 U
Lead, Total	0.004 U	0.004 U	0.004 U

RB - Rinsate Blank  
 FB - Field Blank  
 N/A - Not Analyzed

QA/QC - Quality Assurance/Quality Control  
 U - Indicates compound was analyzed for but not detected



OPERATIONAL TECHNOLOGIES  
C O R P O R A T I O N

Minnesota Air National Guard Remedial Investigation/Feasible Study  
Duluth, Minnesota 1315-197/1315-213  
Southern Petroleum Laboratories Inc.  
Houston, Texas  
Data Evaluation Review

SAMPLE:

SOIL

026-001BH 2-2.5

Lab ID# H9-9505164-01

Date Sampled: 05/03/95

Date Received: 05/04/95

\*Sample Identification needs to be corrected to read from 026-00BH 2-2.5 to 026-001BH 2-2.5.

Volatiles

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Metals

Lead-SW7421=

- \*Hit was detected at 2.8 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*No sample results were reported for Chromium-SW7191.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No sample results were reported for Cadmium-SW6010.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

SAMPLE:

SOIL

026-001BH 9.5-10

Lab ID# H9-9505164-02

Date Sampled: 05/03/95

Date Received: 05/04/95

Volatiles

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Metals

Lead-SW7421=

- \*Hit was detected at 2.4 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 10 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

SAMPLE:

SOIL

026-004BH 2-2.5

Lab ID# H9-9505164-03

Date Sampled: 05/03/95

Date Received: 05/04/95

Volatiles

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Metals

Lead-SW7421=

- \*Hit was detected at 5.3 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 9 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.



**SAMPLE:**

**SOIL**

026-004BH 9.5-10

Lab ID# H9-9505164-04

Date Sampled: 05/03/95

Date Received: 05/04/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 2.5 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 7 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-005BH 1.5-2.5

Lab ID# H9-9505164-05

Date Sampled: 05/03/95

Date Received: 05/04/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 4.6 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 7 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-005BH 9.5-10

Lab ID# H9-9505164-06

Date Sampled: 05/03/95

Date Received: 05/04/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 2.4 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 3 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-006BH 11.5-12

Lab ID# H9-9505164-07

Date Sampled: 05/03/95

Date Received: 05/04/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 2.6 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 4 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

SAMPLE:

SOIL

026-006BH 2-2.5

Lab ID# H9-9505164-08

Date Sampled: 05/03/95

Date Received: 05/04/95

Volatiles

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

- \*Hits was detected on Fluoranthene at 870 ug/kg, Phenanthrene at 800 ug/kg, and Pyrene at 710 ug/kg with detection limits of 660 ug/kg.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Metals

Lead-SW7421=

- \*Hit was detected at 2.4 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 5 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-005BH .5-1.5

Lab ID# H9-9505164-09

Date Sampled: 05/03/95

Date Received: 05/04/95

**Volatiles**

SW846-8240 =

- \*Hit was detected on Toluene at 7 ug/kg with the detection limit of 5 ug/kg.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits. Why was a 3x dilution was performed?
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 4.2 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 8 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-001BH 9-9.5

Lab ID# H9-9505164-10

Date Sampled:

05/03/95

Date Received: 05/04/95

**Volatiles**

---SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 2.5 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 6 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

SAMPLE:

WATER

EQUIPMENT BLANK

Lab ID# H9-9505164-11

Date Sampled: 05/03/95

Date Received: 05/04/95

Volatiles

SW846-8240 =

- \*Hit was detected on Chloroform at 5 ug/l with the detection limit of 5 ug/l.
- \*All met 14-day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Metals

Lead-SW7421=

- \*No hit was detected above the assigned detection limit of 0.004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*No hit was detected above the assigned detection limit of 0.01 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.004 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.004 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.



**SAMPLE:**

**SOIL**

026-001BH 9-9.5 MS

Lab ID# H9-9505164-12

Date Sampled: 05/03/95

Date Received: 05/04/95

**Volatiles**

SW846-8240 =

- \*Spiked compounds were all recovered within acceptable QA/QC Criteria.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*Spiked compounds were all recovered within acceptable QA/QC Criteria.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Spiked compound was recovered within QC Limits.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Spiked compound was recovered within QC Limits.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*Spiked compound was recovered within QC Limits.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-001BH 9-9.5 MSD

Lab ID# H9-9505164-13

Date Sampled: 05/03/95

Date Received: 05/04/95

**Volatiles**

SW846-8240 =

- \*Spiked compounds were all recovered within acceptable QA/QC Criteria. All RPD's were within QC Limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*Spiked compounds were all recovered within acceptable QA/QC Criteria. All RPD's were within QC Limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Spiked compound was recovered within QC Limits. RPD was within QC Limits.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Spiked compound was recovered within QC Limits. RPD was within QC Limits.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*Spiked compound was recovered within QC Limits. RPD was within QC Limits.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-003BH 0.5-1.5

Lab ID# H9-9505209-01

Date Sampled:

05/04/95

Date Received: 05/05/95

**Volatiles**

SW846-8240 =

\*No hits were detected above the assigned detection limits.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

\*No hits were detected above the assigned detection limits. A dilution factor of 2x was applied but was not stated as to what reason it was performed?

\*Met 14 day extraction holding time and 40 day extract holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on a few internal standards.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

\*Hit was detected at 3.2 mg/kg with the detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Chromium-SW7191=

\*Hit was detected at 6 mg/kg with the detection limit of 1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Cadmium-SW6010=

\*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.

\*Met 6 month holding times.

\*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-003BH 1.5-2.5

Lab ID# H9-9505209-02

Date Sampled: 05/04/95

Date Received: 05/05/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on a few internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 5.9 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 18 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-003BH 6.5-7.0

Lab ID# H9-9505209-03

Date Sampled: 05/04/95

Date Received: 05/05/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on a few internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 4.6 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 3.2 mg/kg with the detection limit of 0.2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-002BH 2-2.5

Lab ID# H9-9505209-04

Date Sampled: 05/04/95

Date Received: 05/05/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 3.2 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 3.1 mg/kg with the detection limit of 0.2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

026-002BH 6.5-7

Lab ID# H9-9505209-05

Date Sampled: 05/04/95

Date Received: 05/05/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits but Percent Difference was greater than 20% on a few internal standards.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 1.5 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 3.8 mg/kg with the detection limit of 0.2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 8 mg/kg. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 8 mg/kg as opposed to what was requested in the SOW at 0.5 mg/kg. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**WATER**

026-002 RB

Lab ID# H9-9505209-06

Date Sampled: 05/04/95

Date Received: 05/05/95

**Volatiles**

SW846-8240 =

- \*Hit was detected on Chloroform at 5 ug/l with the detection limit of 5-ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*Hit was detected on 4-Chloro-3-Methylphenol at 8 ug/l above the detection limit of 5 ug/l.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*No hit was detected above the assigned detection limit of 0.004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*No hit was detected above the assigned detection limit of 0.01 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.004 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.004 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.



SAMPLE:

WATER

TRIP BLANK

Lab ID# H9-9505209-07

Date Sampled: 4/26/95

Date Received: 05/05/95

Volatiles

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

SAMPLE:

WATER

025-001 RB

Lab ID# H9-9505512-01

Date Sampled: 05/12/95

Date Received: 05/13/95

Volatiles

SW846-8240 =

- \*No hit was detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

- \*Hit was detected on Phenol at 51 ug/l with the detection limit of 5 ug/l.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Metals

Lead-SW7421=

- \*Hit was detected at 0.006 mg/l above the assigned detection limit of 0.004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*No hit was detected above the assigned detection limit of 0.01 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.004 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.004 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*No hit was detected above the assigned detection limit of 0.02 mg/l. Detection limit for this element should be at 0.01 mg/l as compared to 0.02 mg/l. Please provide an explanation for detection variance.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7470=

- \*No hit was detected above the assigned detection limit of 0.0004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-008BH 10.5-11

Lab ID# H9-9505512-02

Date Sampled: 05/12/95

Date Received: 05/13/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 4.6 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 18 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 26 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-008BH 14.5-15

Lab ID# H9-9505512-03

Date Sampled: 05/12/95

Date Received: 05/13/95

**Volatiles**

SW846-8240 =

\*Hits were detected on Ethylbenzene at 30 ug/kg, Toluene at 29 ug/kg, and Xylenes (Total) at 230 ug/kg with detection limits of 5 ug/kg.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

\*No hits were detected above the assigned detection limits.

\*Met 14 day extraction holding time and 40 day extract holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits. One RPD was not within limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

\*Hit was detected at 6.8 mg/kg with the detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Chromium-SW7191=

\*Hit was detected at 12 mg/kg with the detection limit of 1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Cadmium-SW6010=

\*No hit was detected above the assigned detection limit of 0.5 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Nickel-SW6010=

\*Hit was detected at 27 mg/kg with the detection limit of 2 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Mercury-SW7471=

\*No hit was detected above the assigned detection limit of 0.1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-010BH 2-2.5

Lab ID# H9-9505512-04

Date Sampled: 05/12/95

Date Received: 05/13/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*Hits on Fluoranthene at 420 ug/kg and Pyrene at 360 ug/kg with detection limits 330 ug/kg.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits. One RPD was not within limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 4.6 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 15 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 20 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-010BH 6-6.5

Lab ID# H9-9505512-05

Date Sampled: 05/12/95

Date Received: 05/13/95

**Volatiles**

SW846-8240 =

- \*Hits were detected on Ethylbenzene at 7 ug/kg, Toluene at 17 ug/kg, and Xylenes (Total) at 5 ug/kg with detection limits of 5 ug/kg.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits. One RPD was not within limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 3.6 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 19 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 25 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-011BH 2-2.5

Lab ID# H9-9505512-06

Date Sampled:

05/12/95

Date Received: 05/13/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 5.2 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 19 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 21 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

SAMPLE:

SOIL

025-011BH 6.5-7

Lab ID# H9-9505512-07

Date Sampled: 05/12/95

Date Received: 05/13/95

Volatiles

SW846-8240 =

\*Hit was detected on Xylenes (Total) at 6 ug/kg with the detection limit of 5 ug/kg. Please confirm why Acetone at 53 ug/kg and 2-Butanone at 15 ug/kg were not quantitated on the report forms.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

\*No hits were detected above the assigned detection limits. A 10x dilution was noted as being performed but the accompanying raw data displays only a 1x dilution. Also, the Quantitation Report does not display surrogate on the listing, only the internal standards.

\*Met 14 day extraction holding time and 40 day extract holding time.

\*COC information verified.

\*All RPD's, initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were diluted outside acceptable QC limits.

\*Blanks were clean of any contamination.

Metals

Lead-SW7421=

\*Hit was detected at 6.3 mg/kg with the detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Chromium-SW7191=

\*Hit was detected at 17 mg/kg with the detection limit of 1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Cadmium-SW6010=

\*No hit was detected above the assigned detection limit of 0.5 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Nickel-SW6010=

\*Hit was detected at 18 mg/kg with the detection limit of 2 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Mercury-SW7471=

\*No hit was detected above the assigned detection limit of 0.1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

\*Need Metals Raw data for all analytes run.



**SAMPLE:**

**SOIL**

025-006BH 21.5-22

Lab ID# H9-9505512-08

Date Sampled: 05/12/95

Date Received: 05/13/95

**Volatiles**

SW846-8240 =

\*Hit was detected on Xylenes (Total) at 5 ug/kg with the detection limit of 5 ug/kg. Please confirm whv Acetone at 36 ug/kg and 2-Butanone at 12 ug/kg were not quantitated on the report forms.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

\*No hits were detected above the assigned detection limits. A 3x dilution was noted as being performed but the accompanving raw data displays onlv a 1x dilution.

\*Met 14 day extraction holding time and 40 day extract holding time.

\*COC information verified.

\*All RPD's, initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

\*Hit was detected at 7.6 mg/kg with the detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Chromium-SW7191=

\*Hit was detected at 16 mg/kg with the detection limit of 1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Cadmium-SW6010=

\*No hit was detected above the assigned detection limit of 0.5 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Nickel-SW6010=

\*Hit was detected at 18 mg/kg with the detection limit of 2 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Mercury-SW7471=

\*No hit was detected above the assigned detection limit of 0.1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-009BH 10-11

Lab ID# H9-9505512-09

Date Sampled: 05/12/95

Date Received: 05/13/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits. Two Internal Standard % Differences were greater than 20% in ratio but were within QC Area Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 5.8 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 24 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 22 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-009BH 11-12

Lab ID# H9-9505512-10

Date Sampled: 05/12/95

Date Received: 05/13/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 5.5 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 18 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 19 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

SAMPLE:

SOIL

025-009BH 14-14.5

Lab ID# H9-9505512-11

Date Sampled: 05/12/95

Date Received: 05/13/95

Volatiles

SW846-8240 =

\*Hit was detected on Xylenes (Total) at 8 ug/kg with the detection limit of 5 ug/kg. Please confirm whv Acetone at 54 ug/kg and 2-Butanone at 17 ug/kg were not quantitated on the report forms.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

\*No hits were detected above the assigned detection limits.

\*Met 14 day extraction holding time and 40 day extract holding time.

\*COC information verified.

\*All RPD's, initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

Metals

Lead-SW7421=

\*Hit was detected at 3.8 mg/kg with the detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Chromium-SW7191=

\*Hit was detected at 17 mg/kg with the detection limit of 1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Cadmium-SW6010=

\*No hit was detected above the assigned detection limit of 0.5 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Nickel-SW6010=

\*Hit was detected at 18 mg/kg with the detection limit of 2 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Mercury-SW7471=

\*No hit was detected above the assigned detection limit of 0.1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-009BH 14.5-15 MS

Lab ID# H9-9505512-12

Date Sampled: 05/12/95

Date Received: 05/13/95

\*Sample ID Name needs to read 025-009BH 14.5-15 from 025-009BH 14-14.5 MS. Please Correct.

**Volatiles**

SW846-8240 =

- \*All spiked compounds were recovered within QC acceptance criteria.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Spiked amount was recovered within QC acceptable criteria.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Spiked amount was recovered within QC acceptance criteria.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW7610=

- \*Spiked amount was recovered within QC acceptance criteria.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Spiked amount was recovered within QC acceptance criteria.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*Spiked amount was recovered within QC acceptance criteria.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-009BH 14.5-15 MSD

Lab ID# H9-9505512-13

Date Sampled: 05/12/95

Date Received: 05/13/95

\*Sample ID Name needs to read 025-009BH 14.5-15 from 025-009BH 14-14.5 MSD. Please Correct.

**Volatiles**

SW846-8240 =

- \*All spiked compounds were recovered within QC acceptance criteria. All RPD's are within QC Criteria.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Spiked amount was recovered within QC acceptable criteria. All RPD's are within QC Criteria.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Spiked amount was recovered within QC acceptance criteria. All RPD's are within QC Criteria.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*Spiked amount was recovered within QC acceptance criteria. All RPD's are within QC Criteria.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Spiked amount was recovered within QC acceptance criteria. All RPD's are within QC Criteria.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*Spiked amount was recovered within QC acceptance criteria. All RPD's are within QC Criteria.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

**025-008BH 10.5-11 MS**

Lab ID# H9-9505512-14

Date Sampled: 05/12/95

Date Received: 05/13/95

**Semivolatiles**

SW846-8270 ==

\*All spiked compounds were recovered within QC acceptable criteria.

\*Met 14 day extraction holding time and 40 day extract holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits. Internal Standard RPD's were not within QC Criteria but with areas remaining within.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

**SAMPLE:**

**SOIL**

025-008BH 10.5-11

Lab ID# H9-9505512-15

Date Sampled: 05/12/95

Date Received: 05/13/95

Semivolatiles  
SW846-8270 =

- \*All spiked compounds were recovered within QC acceptable criteria. All RPD's were within QC Criteria.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits. Internal Standard RPD's were not within QC Criteria but with areas remaining within.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.



**SAMPLE:**

**WATER**

**025-001 TB**

Lab ID# H9-9505556-01

Date Sampled:

05/15/95

Date Received: 05/16/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**SAMPLE:****SOIL**

025-001BH 6.5-7.0

Lab ID# H9-9505556-02

Date Sampled: 05/15/95

Date Received: 05/16/95

**Volatiles**

SW846-8240 =

\*Hits were detected on Benzene at 84,000 ug/kg, Ethylbenzene at 140,000 ug/kg, Toluene at 460,000 ug/kg, and Xylenes (Total) at 680,000 ug/kg with detection limits of 12,000 ug/kg. Dilution Factor of 2,500x was applied for analysis.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits. All surrogate recoveries for the Diluted analysis were recovered outside of QC Range.

\*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

\*Hits were detected on 2-Methylnaphthalene at 12,000 ug/kg, Naphthalene at 14,000 ug/kg with detection limits of 3,300 ug/kg and Phenol at 350 ug/kg with the detection limit of 330 ug/kg. A 10x dilution was performed for this analysis.

\*Met 14 day extraction holding time and 40 day extract holding time.

\*COC information verified.

\*All RPD's, initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits. All surrogates for the 10x dilution were diluted out of QC Range.

\*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

\*Hit was detected at 3.2 mg/kg with the detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Chromium-SW7191=

\*Hit was detected at 9 mg/kg with the detection limit of 1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Cadmium-SW6010=

\*No hit was detected above the assigned detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Nickel-SW6010=

\*Hit was detected at 25 mg/kg with the detection limit of 2 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Mercury-SW7471=

\*No hit was detected above the assigned detection limit of 0.1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:****SOIL**

025-002BH 11.5-12.0

Lab ID# H9-9505556-03

Date Sampled: 05/15/95

Date Received: 05/16/95

**Volatiles**

SW846-8240 =

\*Hits were detected on Benzene at 1,700 ug/kg, Ethylbenzene at 9,700 ug/kg, Toluene at 26,000 ug/kg, and Xylenes (Total) at 52,000 ug/kg with detection limits of 12,000 ug/kg. Dilution Factor of 250x was applied for analysis.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits. All surrogates were diluted out of QC Range for the diluted sample.

\*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

\*Hits were detected on 2-Methylnaphthalene at 2,300 ug/kg and Naphthalene at 2,100 ug/kg with detection limits of 330 ug/kg

\*Met 14 day extraction holding time and 40 day extract holding time.

\*COC information verified.

\*All RPD's, initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

\*Hit was detected at 1.7 mg/kg with the detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Chromium-SW7191=

\*Hit was detected at 6 mg/kg with the detection limit of 1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Cadmium-SW6010=

\*No hit was detected above the assigned detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Nickel-SW6010=

\*Hit was detected at 21 mg/kg with the detection limit of 2 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Mercury-SW7471=

\*No hit was detected above the assigned detection limit of 0.1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-003BH 11-12

Lab ID# H9-9505556-04

Date Sampled: 05/15/95 -- Date Received: 05/16/95

**Volatiles**

SW846-8240 =

- \*Hits were detected on Ethylbenzene at 120 ug/kg and Xylenes (Total) at 800 ug/kg with detection limits of 25 ug/kg. Dilution Factor of 5x was applied for analysis.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 3.0 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 15 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 22 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:****SOIL**

025-003BH 10'-11'

Lab ID# H9-9505556-05

Date Sampled: 05/15/95

Date Received: 05/16/95

**Volatiles**

SW846-8240 =

\*Hits were detected on Ethylbenzene at 5,300 ug/kg and Xylenes (Total) at 29,000 ug/kg with detection limits of 1,200 ug/kg. Dilution Factor of 250x was applied for analysis.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits. Surrogates that were applied to the dilution were diluted out of QC Range.

\*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

\*Hit was detected on 2-Methylnapthalene at 330 ug/kg with the detection limit of 330 ug/kg.

\*Met 14 day extraction holding time and 40 day extract holding time.

\*COC information verified.

\*One RPD's was outside QC Limits; Initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

\*Hit was detected at 2.6 mg/kg with the detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Chromium-SW7191=

\*Hit was detected at 11 mg/kg with the detection limit of 2 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Cadmium-SW6010=

\*Hit was detected at 0.5 mg/kg with a detection limit of 0.4 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Nickel-SW6010=

\*Hit was detected at 26 mg/kg with the detection limit of 2 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

Mercury-SW7471=

\*No hit was detected above the assigned detection limit of 0.1 mg/kg.

\*Met 6 month holding times.

\*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**WATER**

025-003 TB

Lab ID# H9-9505612-01

Date Sampled: 05/16/95

Date Received: 05/17/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

SAMPLE:

WATER

025-002 RB

Lab ID# H9-9505612-02

Date Sampled:

05/16/95

Date Received: 05/17/95

Volatiles

SW846-8240 =

- \*Hit was detected on Chloroform at 5 ug/l with the detection limit of 5 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

- \*Hit was detected on Di-n-butylphthalate at 5 ug/l with the detection limit of 5 ug/l.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits..
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Metals

Lead-SW7421=

- \*Hit was detected at 0.006 mg/l above the assigned detection limit of 0.004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*No hit was detected above the assigned detection limit of 0.002 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.004 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.004 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*No hit was detected above the assigned detection limit of 0.02 mg/l. Detection limit for this element should be at 0.01 mg/l as compared to 0.02 mg/l. Please provide an explanation for detection variance.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7470=

- \*No hit was detected above the assigned detection limit of 0.0004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-007BH 11.5'-12'

Lab ID# H9-9505612-03

Date Sampled: 05/16/95

Date Received: 05/17/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 6.1 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 6 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 16 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.



**SAMPLE:**

**SOIL**

025-005BH 11.5'-12'

Lab ID# H9-9505612-04

Date Sampled: 05/16/95

Date Received: 05/17/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 1.9 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 6 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 17 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

025-004BH 11.5'-12'

Date Sampled: 05/16/95

**SOIL**

Lab ID# H9-9505612-05

Date Received: 05/17/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 2.0 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 9 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 17 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:****SOIL**

025-004BH 19.5'-20'

Lab ID# H9-9505612-06

Date Sampled: 05/16/95

Date Received: 05/17/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 4.5 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 18 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 23 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

SAMPLE:

025-003 RB

WATER

Lab ID# H9-9505767-01

Date Sampled: 05/19/95

Date Received: 05/20/95

Volatiles  
SW846-8010 =

- \*Hits were detected on Chloroform at 5 ug/l and Methylene Chloride at 4 ug/l with the detection limit of 1 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.
- \*Missing BTEX raw data and chromatograms for this sample.

Volatiles  
SW846-8020 =

- \*No hits were detected above the assigned detection limits of 1 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.
- \*Missing raw data and chromatograms for this sample.

Semivolatiles  
SW846-8270 =

- \*Hit was detected on Di-n-butylphthalate at 5 ug/l with the detection limit of 5 ug/l.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits..
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Metals

Lead-SW7421=

- \*No hit was detected above the assigned detection limit of 0.004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*No hit was detected above the assigned detection limit of 0.002 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.005 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.005 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*No hit was detected above the assigned detection limit of 0.02 mg/l. Detection limit for this element should be at 0.01 mg/l as compared to 0.02 mg/l. Please provide an explanation for detection variance.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7470=

- \*No hit was detected above the assigned detection limit of 0.0004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

SAMPLE:

WATER

SI-002FB

Lab ID# H9-9505767-02

Date Sampled: 05/19/95

Date Received: 05/20/95

Volatiles

SW846-8260 =

- \*Hit was detected on Chloroform at 6 ug/l with the detection limit of 5 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

- \*It was noted on the COC to perform a Semi-volatile analysis but the laboratory received the sample broken and informed us to not being able to perform the analysis. But, Raw data was accompanied with the sample report forms and not documented on the report forms.

Metals

Lead-SW7421=

- \*No hit was detected above the assigned detection limit of 0.004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*No hit was detected above the assigned detection limit of 0.002 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.005 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.005 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*No hit was detected above the assigned detection limit of 0.02 mg/l. Detection limit for this element should be at 0.01 mg/l as compared to 0.02 mg/l. Please provide an explanation for detection variance.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7470=

- \*No hit was detected above the assigned detection limit of 0.0004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

025-001-MW-GW01

**WATER**

Lab ID# H9-9505767-03

Date Sampled: 05/19/95

Date Received: 05/20/95

**Volatiles**

SW846-8010 =

- \*No hits were detected above the assigned detection of 1 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.
- \*Missing BTEX raw data and chromatograms for this sample.

**Volatiles**

SW846-8020 =

- \*No hits were detected above the assigned detection limits of 1 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.
- \*Missing raw data and chromatograms for this sample.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.
- \*Missing raw data and chromatograms.

**Metals**

Lead-SW7421=

- \*Hit was detected at 0.008 mg/l above the assigned detection limit of 0.004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 0.036 mg/l above the assigned detection limit of 0.002 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.005 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.005 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 0.07 mg/l above the assigned detection limit of 0.02 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7470=

- \*No hit was detected above the assigned detection limit of 0.0004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**WATER**

**025-TB**

Lab ID# H9-9505767-04

Date Sampled:

05/19/95

Date Received: 05/20/95

**Volatiles**

SW846-8010 =

\*No hits were detected above the assigned detection of 1 ug/l.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

\*Missing BTEX raw data and chromatograms for this sample.

**Volatiles**

SW846-8020 =

\*Hit was detected at Methylene Chloride at 3 ug/l above the assigned detection limits of 1 ug/l. Hit was confirmed to be detected in the method blank.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

\*Missing raw data and chromatograms for this sample.

## SAMPLE:

## WATER

025-003 MW-GW04

Lab ID# H9-9505767-05

Date Sampled:

05/19/95

Date Received: 05/20/95

## Volatiles

SW846-8010 =

- \*Hit was detected on Methylene Chloride at 30 ug/l with the detection limit of 25 ug/l. A 25x dilution factor was applied.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.
- \*Missing BTEX raw data and chromatograms for this sample.

## Volatiles

SW846-8020 =

- \*Hits were detected for Total BTEX at 5,920 ug/l above the assigned detection limits of 5 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.
- \*Missing raw data and chromatograms for this sample.

## Semivolatiles

SW846-8270 =

- \*Hit was detected on 2-Methylnaphthalene at 11 ug/l, 4-Methylphenol at 9 ug/l, Naphthalene at 75 ug/l, and Phenol at 15 ug/l with the detection limits of 5 ug/l.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits..
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

## Metals

Lead-SW7421=

- \*Hit was detected at 0.005 mg/l above the assigned detection limit of 0.004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 0.015 mg/l with the assigned detection limit of 0.002 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.005 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.005 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 0.03 ug/l above the assigned detection limit of 0.02 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7470=

- \*No hit was detected above the assigned detection limit of 0.0004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.



## SAMPLE:

## WATER

025-003A-GW01

Lab ID# H9-9505767-06

Date Sampled:

05/19/95

Date Received: 05/20/95

## Volatiles

SW846-8010 =

\*No hits were detected above the assigned detection limits. A 25x dilution was performed on this analysis but no hits were encountered, what was the reason for the dilution?

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

\*Missing BTEX raw data and chromatograms for this sample.

## Volatiles

SW846-8020 =

\*Hits were detected for Total BTEX at 5,530 ug/l above the assigned detection limits of 5 ug/l.

\*All met 14 day holding time.

\*COC information verified.

\*All initial and continuing calibrations were within acceptable QC Limits.

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

\*Missing raw data and chromatograms for this sample.

## Semivolatiles

SW846-8270 =

\*Hit was detected on 2-Methylnaphthalene at 8 ug/l, 4-Methylphenol at 8 ug/l, Naphthalene at 51 ug/l, and Phenol at 12 ug/l with the detection limits of 5 ug/l.

\*Met 7 day extraction holding time and 40 day extract holding time.

\*COC information verified.

\*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits..

\*All surrogate recoveries were within acceptable QC limits.

\*Blanks were clean of any contamination.

## Metals

Lead-SW7421=

\*Hit was detected at 0.007 mg/l above the assigned detection limit of 0.004 mg/l.

\*Met 6 month holding times.

\*COC information verified.

Chromium-SW7191=

\*Hit was detected at 0.019 mg/l with the assigned detection limit of 0.002 mg/l.

\*Met 6 month holding times.

\*COC information verified.

Cadmium-SW6010=

\*No hit was detected above the assigned detection limit of 0.005 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.005 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.

\*Met 6 month holding times.

\*COC information verified.

Nickel-SW6010=

\*Hit was detected at 0.04 ug/l above the assigned detection limit of 0.02 mg/l.

\*Met 6 month holding times.

\*COC information verified.

Mercury-SW7470=

\*No hit was detected above the assigned detection limit of 0.0004 mg/l.

\*Met 6 month holding times.

\*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**WATER**

026-002-MW-GW1

Lab ID# H9-9505714-01

Date Sampled: 05/18/95

Date Received: 05/19/95

**Volatiles**

SW846-8260 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits..
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**SAMPLE:**

**WATER**

**026-003A-MW-GW1**

Lab ID# H9-9505714-02

Date Sampled: 05/18/95

Date Received: 05/19/95

**Volatiles**

SW846-8260 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits..
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**SAMPLE:**

**WATER**

**026-001-MW-GW1**

**Lab ID# H9-9505714-03**

**Date Sampled: 05/18/95**

**Date Received: 05/19/95**

**Volatiles**

**SW846-8260 =**

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

**SW846-8270 =**

- \*No hits were detected above the assigned detection limits.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits..
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

SAMPLE:

WATER

SI-001-FB

Lab ID# H9-9505714-05

Date Sampled: 05/18/95

Date Received: 05/19/95

Volatiles

SW846-8260 =

- \*Hit on Chloroform at 5 ug/l was detected with a detection limit of 1 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Semivolatiles

SW846-8270 =

- \*Hit was detected on Di-n-butylphthalate at 5 ug/l with the detection limit of 5 ug/l.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits..
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

Metals

Lead-SW7421=

- \*No hit was detected above the assigned detection limit of 0.004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*No hit was detected above the assigned detection limit of 0.002 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.005 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.005 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*No hit was detected above the assigned detection limit of 0.02 mg/l. The limit for Nickel as stated in the SOW is to be at 0.01 mg/l but is reported at 0.02 mg/l. Please explain the variance in the detection limits.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7470=

- \*No hit was detected above the assigned detection limit of 0.0004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

SAMPLE:

WATER

SI-001-TB

Lab ID# H9-9505714-06

Date Sampled: 05/8/95 Date Received: 05/19/95

Volatiles

SW846-8260 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**SAMPLE:**

**WATER**

**026-003-RB**

Lab ID# H9-9505714-07

Date Sampled: 05/18/95

Date Received: 05/19/95

**Volatiles**

SW846-8260 =

- \*Hit was detected on Chloroform at 4 ug/l and Methylene Chloride at 3 ug/l with detection limits of 1 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits..
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**SAMPLE:****WATER**

025-002-MW-GW1

Lab ID# H9-9505714-08

Date Sampled:

05/18/95

Date Received: 05/19/95

**Volatiles**

SW846-8010 =

- \*Hit was detected on 1,2-Dichloroethane at 11 ug/l with the detection limit of 1 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.
- \*Missing raw data and chromatograms for this sample.

**Volatiles**

SW846-8020 =

- \*Hits were detected for Total BTEX at 1 ug/l above the assigned detection limits of 1 ug/l.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.
- \*Missing BTEX raw data and chromatograms for this sample.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 7 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits..
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*No hit was detected above the assigned detection limit of 0.004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 0.011 mg/l with the assigned detection limit of 0.002 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.005 mg/l. The detection limit for Cadmium for this batch analyzed had an elevated detection limit of 0.005 mg/l as opposed to what was requested in the SOW at 0.0006 mg/l. Usability of the data is questionable without a valid explanation of the elevated detection limit.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 0.03 ug/l above the assigned detection limit of 0.02 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7470=

- \*No hit was detected above the assigned detection limit of 0.0004 mg/l.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.



**SAMPLE:****SOIL**

025-012BH 11.5'-12'

Lab ID# H9-9505673-02

Date Sampled: 05/17/95

Date Received: 05/18/95

**Volatiles**

SW846-8240 =

- \*Hits were detected on Benzene at 29 ug/kg, Toluene at 8 ug/kg, and Xylenes (Total) at 11 ug/kg with detection limits of 5 ug/kg.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 4.3 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 11 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 15 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-012BH 19.5'-20'

Lab ID# H9-9505673-03

Date Sampled: 05/17/95

Date Received: 05/18/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 5.3 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 13 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 9 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.

**SAMPLE:**

**SOIL**

025-013BH 11.5'-12'

Lab ID# H9-9505673-04

Date Sampled:

05/17/95

Date Received:

05/18/95

**Volatiles**

SW846-8240 =

- \*No hits were detected above the assigned detection limits.
- \*All met 14 day holding time.
- \*COC information verified.
- \*All initial and continuing calibrations were within acceptable QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Semivolatiles**

SW846-8270 =

- \*No hits were detected above the assigned detection limits.
- \*Met 14 day extraction holding time and 40 day extract holding time.
- \*COC information verified.
- \*All RPD's, initial and continuing calibrations were within acceptable QC Limits.
- \*Initial and continuing calibrations had % Differences that were outside QC Ranges but within area QC Limits.
- \*All surrogate recoveries were within acceptable QC limits.
- \*Blanks were clean of any contamination.

**Metals**

Lead-SW7421=

- \*Hit was detected at 3.2 mg/kg with the detection limit of 0.4 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Chromium-SW7191=

- \*Hit was detected at 6 mg/kg with the detection limit of 1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Cadmium-SW6010=

- \*No hit was detected above the assigned detection limit of 0.5 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Nickel-SW6010=

- \*Hit was detected at 16 mg/kg with the detection limit of 2 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

Mercury-SW7471=

- \*No hit was detected above the assigned detection limit of 0.1 mg/kg.
- \*Met 6 month holding times.
- \*COC information verified.

\*Need Metals Raw data for all analytes run.